Assessment of Dam Safety
Coal Combustion Surface Impoundments (Task 3)
Draft Report

Georgia Power Company

Plant Branch

Milledgeville, GA

Prepared for

Lockheed Martin

2890 Woodridge Ave #209
Edison, New Jersey 08837

December 23, 2009

CHA Project No. 20085.2060.1510

CHA

I acknowledge that the management units referenced herein:

- Plant Branch Ash Ponds B, C, D and E

Have been assessed on May 23, 2009 and May 24, 2009.

Signature: _____

Malcolm D. Hargraves, P.E.
Senior Geotechnical Engineer
Registered in the State of Georgia

Signature: _____

Katherine E. Adnams, P.E.
Senior Geotechnical Engineer

Reviewer: _____

Warren A. Harris, P.E.
Geotechnical Operations Manager
Registered in the State of Georgia

TABLE OF CONTENTS

SECTION **PAGE NUMBER**

TABLE OF CONTENTS - continued

SECTION **PAGE NUMBER**

TABLES

LIST OF FIGURES

APPENDIX

1.0 INTRODUCTION & PROJECT DESCRIPTION

1.1 Introduction

CHA was contracted by Lockheed Martin to perform site assessments of selected coal combustion surface impoundments (Project #0-381 Coal Combustion Surface Impoundments/Dam Safety Inspections). As part of this contract, CHA was assigned to perform a site assessment of Georgia Power Company's Plant Branch, which is located in Milledgeville, Georgia as shown on Figure 1 – Project Location Map.

CHA made a site visit on November 23, 2009 and November 24, 2009 to perform visual observations and to inventory coal combustion surface impoundments at the facility, inspect the containment dikes, and to collect relevant information regarding the site assessment. On the date this draft report was published CHA received a package of additional documents from Georgia Power to review. This data will be reviewed and incorporated into the final report.

CHA engineers, Malcolm Hargraves, P.E. and Cody Johnson, were accompanied during the site visit by the following individuals:

Company or Organization	**Name and Title**
Environmental Protection Agency	Craig Dufficy, Environmental Engineer
Georgia Dept. of Natural Resources	Carey Anderson, Environmental Engineer
Georgia Dept. of Natural Resources	Charles Grizzard, Environmental Engineer
Georgia Power Company – Branch	Johnny Howze, Plant Manager
Georgia Power Company – Branch	Sandy Lloyd, Safety and Health Advisor
Georgia Power Company – Branch	Cynthia Dixon, Team Leader - Compliance
Georgia Power Company – Branch	Brenda Southerland, Compliance and Support Mgr.
Georgia Power Company	Rochelle Routman, Environmental Specialist

Company or Organization	Name and Title
Georgia Power Company	Tanya Blalock, Environmental Affairs Manager
Southern Company	Gary McWhorter, P.E., Environmental Engineering
Southern Company	Ron Wood, P.G., Hydro Services
Southern Company	Joel Galt, P.E., Hydro Services Supervisor
Troutman Sanders	Holly Hill, Attorney

1.2 Project Background

The Plant Branch Ash Pond "E" is under the jurisdiction of the Georgia Department of Natural Resources Environmental Protection Division (EPD) Safe Dams Program (Georgia State ID. 117-002-00108). Ash Pond E is listed on the National Inventory of Dams (NID) identified at GA04576. Identification numbers have not been assigned for Ash Ponds A, B, C, or D.

As indicated by the Georgia Safe Dams program, Ash Pond E has been categorized as a "Category I" dam by the Georgia Soil and Water Conservations Committee under Georgia Safe Dams Act of 1978. This means improper operation or dam failure would result in the probable loss of human life, as per the Rules of the Georgia Department of Natural Resources Environmental Protection Division Chapter 391-3-8 Rules for Dam Safety, Section 391-3-8-.02(d). Ash pond "E" is annually inspected by the Georgia Department of Natural Resources Safe Dams Program engineers.

According to the Georgia Safe Dams program, the Ash Ponds B and D have been categorized as a "Category II" dams, meaning improper operation or dam failure would not be expected to result in probable loss of human life, as per. Category II facilities are exempt from much of the Georgia dam safety regulations thereby leaving the design, operation, and maintenance standards up to the owner's discretion for best management practices. According to Georgia Safe Dams personnel, as a Category II dam the facility is not held to any state recognized design standards.

At this time, no information is available regarding the category classification for Ash Ponds A or C.

1.2.1 State Issued Permits

The State of Georgia issued Permit No. GA0026051 to the Georgia Power Company authorizing discharge under the National Pollutant Discharge Elimination System to Lake Sinclair in the Oconee River Basin in accordance with effluent limitations, monitoring requirements and other conditions set forth in the permit. The permit became effective on March 30, 2005 and will expire on February 28, 2010.

1.3 Site Description and Location

The Plant Branch management units are shown on Figure 2A – Photo Site Plan. The impoundments at the Plant Branch facility consist of a total of four active ponds (B, D, C, and E) and one closed pond (A). The commissioning and subsequent expansion for each of the five dams at Plant Brach is indicated below:

Ash Pond A:	commissioned in 1965
Ash Pond B:	commissioned in 1967
Ash Pond C:	commissioned in 1971
Ash Pond D:	commissioned in 1980
Ash Pond E:	commissioned in 1982; capacity expanded in 2004 by means of raising the dike elevation.

A map of the region indicating the location of the Plant Branch station and ash ponds and identifying schools, hospitals, or other critical infrastructure located within approximately five miles down gradient of the ash pond is provided as Figure 3 – Critical Infrastructure Map. Ash Pond E, which contains the largest volume of liquid, is about one mile upstream of Lake Sinclair.

1.3.1 Ash Pond B

Construction drawings were not provided for Ash Pond B. Based upon a review of aerial photographs, the south dike for Ash Pond B is approximately 1,700 feet long.

The impoundment for Ash Pond B was created by construction of a dike across a cove on the south and southwest sides as shown in Figure 2B. Based upon information provided in the Southern Company inspection report for the 2nd quarter of 2009, we understand that the dike was constructed in 2 phases. The first phase entailed dumping large rock and soil across the opening of a cove to create a rock base approximately 10 to 15 feet above rock level. The second phase entailed dumping "somewhat smaller" rock and large portions of soil from the plant excavation. Approximately 3 feet of clayey silt was dumped on top to form a clay cap approximately 80-feet-wide. Construction was completed in 1967 creating an impoundment surface area of approximately 75 acres. A sketch shown in Figure 5A indicated that dike crest is approximately 80 feet across with slopes extending 60 feet out from each edge of the crest on a 1.5/1 slope.

Ash Pond B is used for the storage of bottom ash recovered from the coal power production process. Previously, bottom ash was placed in this pond until sold. However, as explained by Georgia Power personnel, at this time bottom ash is not being sold and only impounded.

1.3.2 Ash Pond C

Ash Pond C is impounded by three dikes on the west, south, and east sides as shown on Figure 2C. The remaining sides of the pond are contained by natural hills. The west dike is approximately 1,300-feet-long, the south dike is approximately 1,700-feet-long, and the east dike is approximately 1,700-feet-long. The drawing indicates that the dikes were to be constructed with a slope of 2H:1V but the "upstream slope may be changed to 1.75H:1V at the discretion of the engineer if suitable foundation conditions are encountered". The remaining portions of the

impoundment are contained by natural ground. Information on the material used in construction of the dikes was not provided.

Construction of the impoundment began in 1971 and upon its completion it created a total surface area of 70 acres. Ash Pond C is currently used primarily as a final settlement stage for the fly ash deposition process at Plant Branch. The fly ash is dredged from the pond as it settles out.

1.3.3 Ash Pond D

Construction Ash Pond D began in 1980 and consisted of a dike along the southwest side of the pond as shown in Figure 2D. The other sides of the impoundment are contained by natural hills. The dike is approximately 2,300-feet- long and constructed with a downstream slope of 2.5H:1V and an upstream slope of 2.25H:1V as shown in Figure 5D. Material for construction of the dike was excavated from the northeastern portion of the pond area. The cross section indicates that the most impervious material was to be placed in the center of the dam; information on nature of the material and method of placement and compaction was not provided. The impoundment created a total surface area of 45 acres upon its completion.

A blanket drain was installed below the dike, as shown in Figure 5D. Initial construction also included a trench drain below the highest section of the dike. Finger drains transmit the water collected by the blanket drain into concrete lined drainage channels constructed parallel to the dike toe. The channels also collect surface runoff and outlet through a corrugated metal pipe culvert that conveys the water beneath an access drive and out to a Lake Sinclair drainage feature.

1.3.4 Ash Pond E

The original construction of Ash Pond E began in 1982 and consisted of one main dike along the eastern boundary of the pond which impounds water into a broad valley area as shown in Figure 2E. The dike is approximately 3,600-feet-long as shown in Figure 5E and the impoundment created a total surface area of 311 acres. As shown in the section on Figure 5F, the dike was constructed using a slope of 3H:1V on the downstream side of the crest and a slope of 2.5H:1V on the upstream side of the crest. The cross section indicates that the most impervious material was to be placed in the center of the dam with compacted fill on the upstream and downstream slopes; information on nature of the material and method of placement and compaction was not provided.

Subsequently, in 2004, the dike height for Ash Pond E was raised to provide additional storage capacity. The new dike height did not significantly increase the surface area for the pond; however, it did provide additional volumetric capacity for storage.

It is understood that all fly ash from the coal power production process is "sluiced" and pumped to Ash Pond E to allow for ash storage and settlement. From Ash Pond E, water is decanted and discharges via a 36-inch diameter underground pipe into Pond D. Seepage through the embankment is collected through a blanket drainage system where it is discharged directly into a drainage tributary to Lake Sinclair.

1.3.5 Other Impoundments

In addition to the coal combustion waste (CCW) disposal areas described above, CHA also was made aware of one additional impoundment, Ash Pond A, which is no longer in use. Based upon information provided by Georgia Power personnel, construction of the Ash Pond A dike began in 1965 and upon its completion had a surface area of 0.9 acres. It is understood that this pond was

filled to capacity and was closed per regulations at the time of site closure in June of 1966. No other information regarding ash pond "A" has been provided to CHA at this time.

1.4 Previously Identified Safety Issues

There have been two previously identified dam safety issues at Plant Branch. One of the two incidents resulted in release of CCW from the Ash Pond C in the last ten years. In January 1969 grouting procedures were implemented in effort to alleviate five recognized areas of leakage from Ash Pond B and in December 2000, a mechanical failure caused water from Ash Pond C to be discharged through the cooling water tunnel system into Lake Sinclair. These incidents are discussed in more detail in Sections 1.4.1 and 1.4.2

1.4.1 1969 Release – Ash Pond B

As described in a April 1969 report regarding recent completion of the dike and subsequent inspection of the dikes performance,

> "Upon initial inspection, five zones of leakage were observed on the downstream slope at or near lake level. A cascade located at station 3+20 approximately five feet above the lake level and a large flow at the waterline near station 5+20 exhibited the largest flows and greatest concentration of ash of the five zones. Fine ash leaking through the dike has deposited on adjacent beaches (see pictures in the report dated 12-11-68)."

Additionally, the report states "From the grouting logs and present performance of the dike, the curtain established along the grout line is considered to be as complete as is practicable. Leakage at stations 4+10, 4+30, and 4+70 was completely stopped; while flows at stations 3+20 and 5+20 were reduced to a slight trickle and a very slight bubble, respectively." The grouting program successfully arrested the leakage and was completed by the end of March 1969.

1.4.2 2000 Release –Ash Pond C

On December 1, 2000, a mechanical failure of an isolation valve caused water from Ash Pond C to be siphoned back and discharged through the cooling water tunnel system into Lake Sinclair. Subsequently, a written letter of notification was submitted to the Georgia EPD on December 08, 2000. A copy of the submission has not been provided to CHA and no additional information is available regarding remediation or future procedural implementation.

1.5 Site Geology

The *Geologic Map of Georgia* prepared by S.M. Pickering, Jr. McDowell et al. in 1976 for the Georgia Department of Natural Resources indicates that the Plant Branch facilities lie in the Blue Ridge and Piedmont physiographic province above residual soil derived from crystalline metamorphic bedrock. This basement bedrock comprises biotite granitic gneiss, feldspathic biotite gneiss, and amphibolite-hornblende gneiss.

1.6 Bibliography

Georgia Power has provided CHA with copies of correspondences, reports and plans pertaining to the tasks outlined above. A list of these items is provided below. As part of our assessment, information and data from these reports and plans were compared with existing site conditions observed during our site visit.

- Lowe, H. D Existing Ash Pond Dike Grouting – (Final Report), April 24, 1969
- Plant Branch Georgia Power Responses to EPA Request for Information under Section 104(c) of the Comprehensive Environmental Response, Compensation, and Liability Act. 42 U.S.C. 9604(e), March 25, 2009
- Galt, Joel. *Plant Branch Dam Safety Surveillance Quarterly Reports*, Southern Company Services, Inc (various reports from 04/2006 to 11/2009).

- Georgia Department of Natural Resources *Annual Dam Inspection*, various reports from 1992 to 2008
- Georgia Power, *Aerial Photographs for ponds B, C, D, & E*, dates of photographs unknown.
- Hartsfield, Terri H. *Plant Bowen Ash Pond Dike Slope Stability Analysis Report*, Southern Company Services, Inc., November 2009.
- Georgia Power/Southern Company, Plant Branch design documents for Ponds B, C, D, and E.

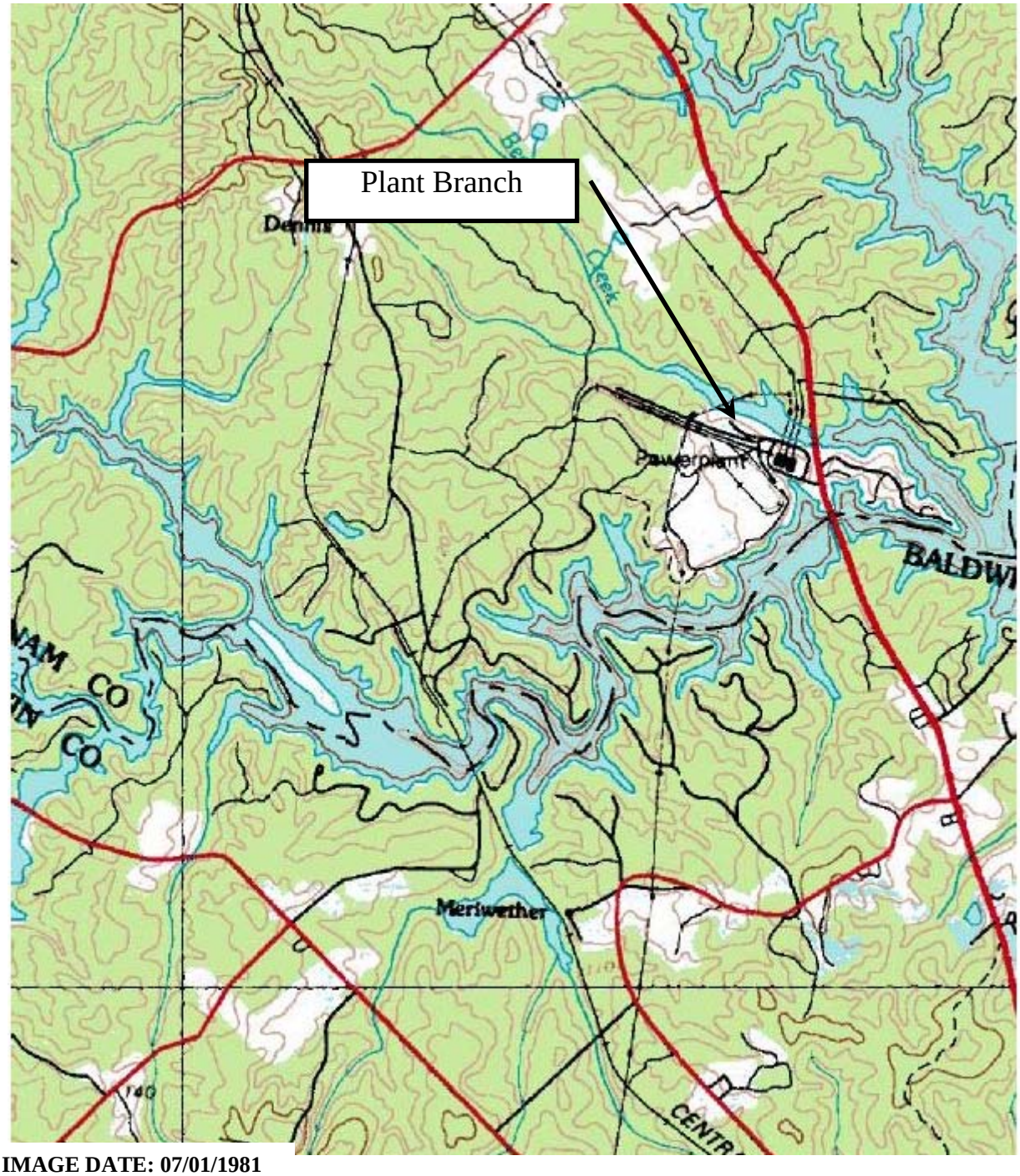

IMAGE DATE: 07/01/1981

N	CHA	**Figure 1** **Project Location Map**
	Scale: 1" = 1 mile	**Project No.:** **20085.2060.1510**
		Georgia Power **Plant Branch** **Milledgeville, GA**

IMAGE REFERENCE: GOOGLE EARTH, IMAGE DATED JUNE 17, 2006.

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PHOTO SITE PLAN OVERVIEW

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 2A

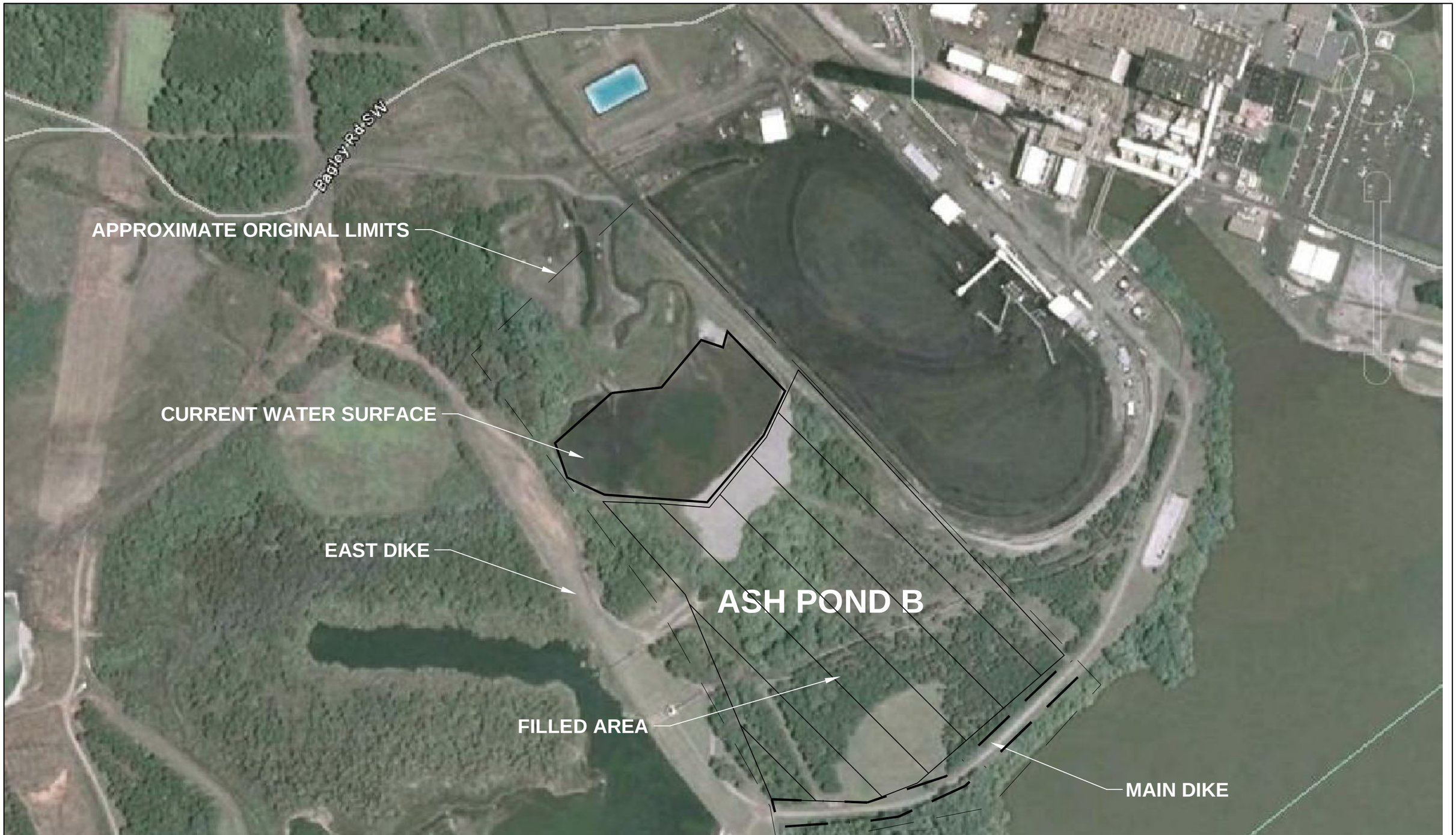

IMAGE REFERENCE: GOOGLE EARTH, IMAGE DATED JUNE 17, 2006.

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PHOTO SITE PLAN ASH POND B

PLANT BRANCH
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PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 2B

IMAGE REFERENCE: GOOGLE EARTH, IMAGE DATED JUNE 17, 2006.

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PHOTO SITE PLAN ASH POND C

PLANT BRANCH
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DATE: 12/2009

FIGURE 2C

IMAGE REFERENCE: GOOGLE EARTH, IMAGE DATED JUNE 17, 2006.

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PHOTO SITE PLAN ASH POND D

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 2D

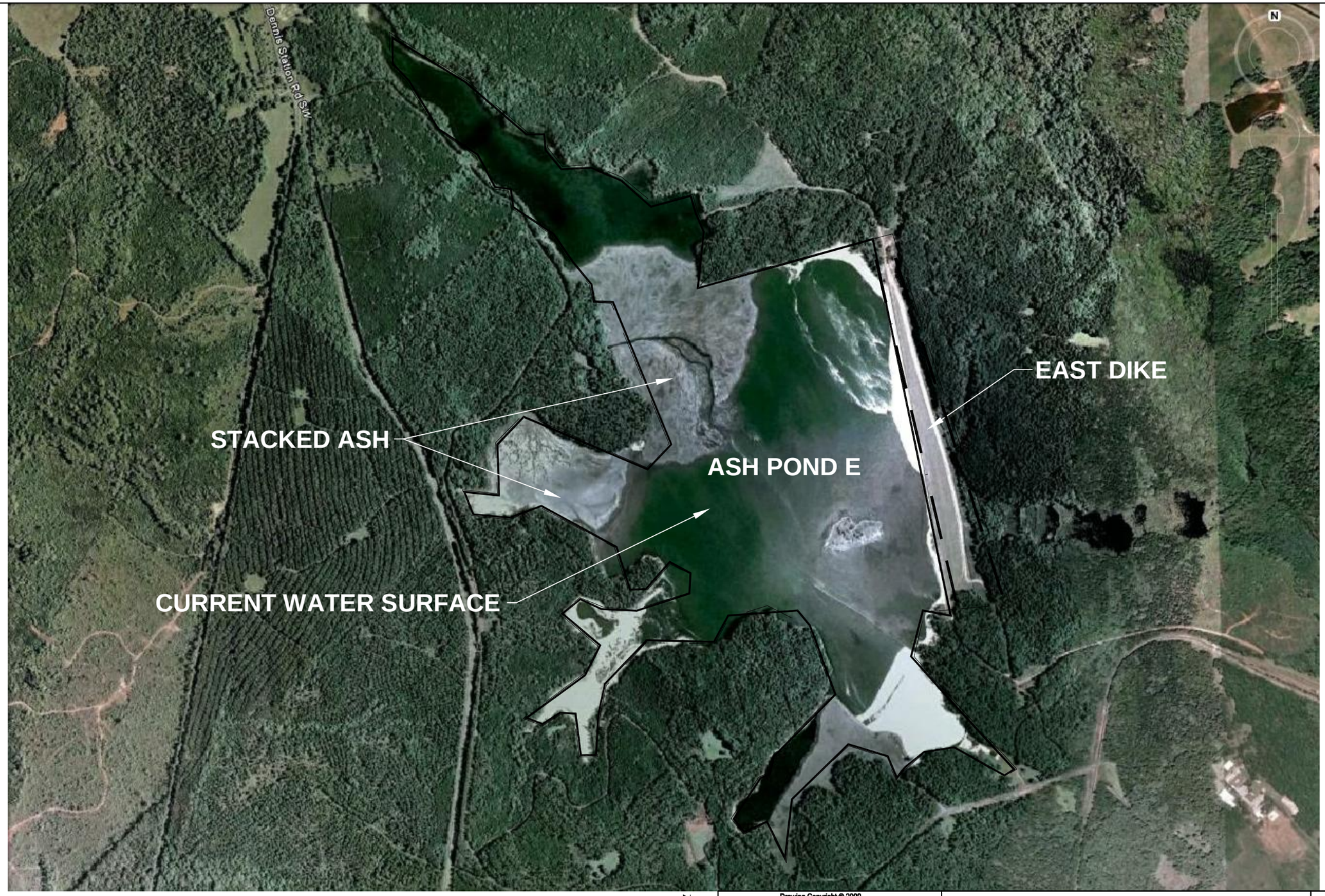

IMAGE REFERENCE: GOOGLE EARTH, IMAGE DATED JUNE 17, 2006.

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PHOTO SITE PLAN ASH POND E

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 2E

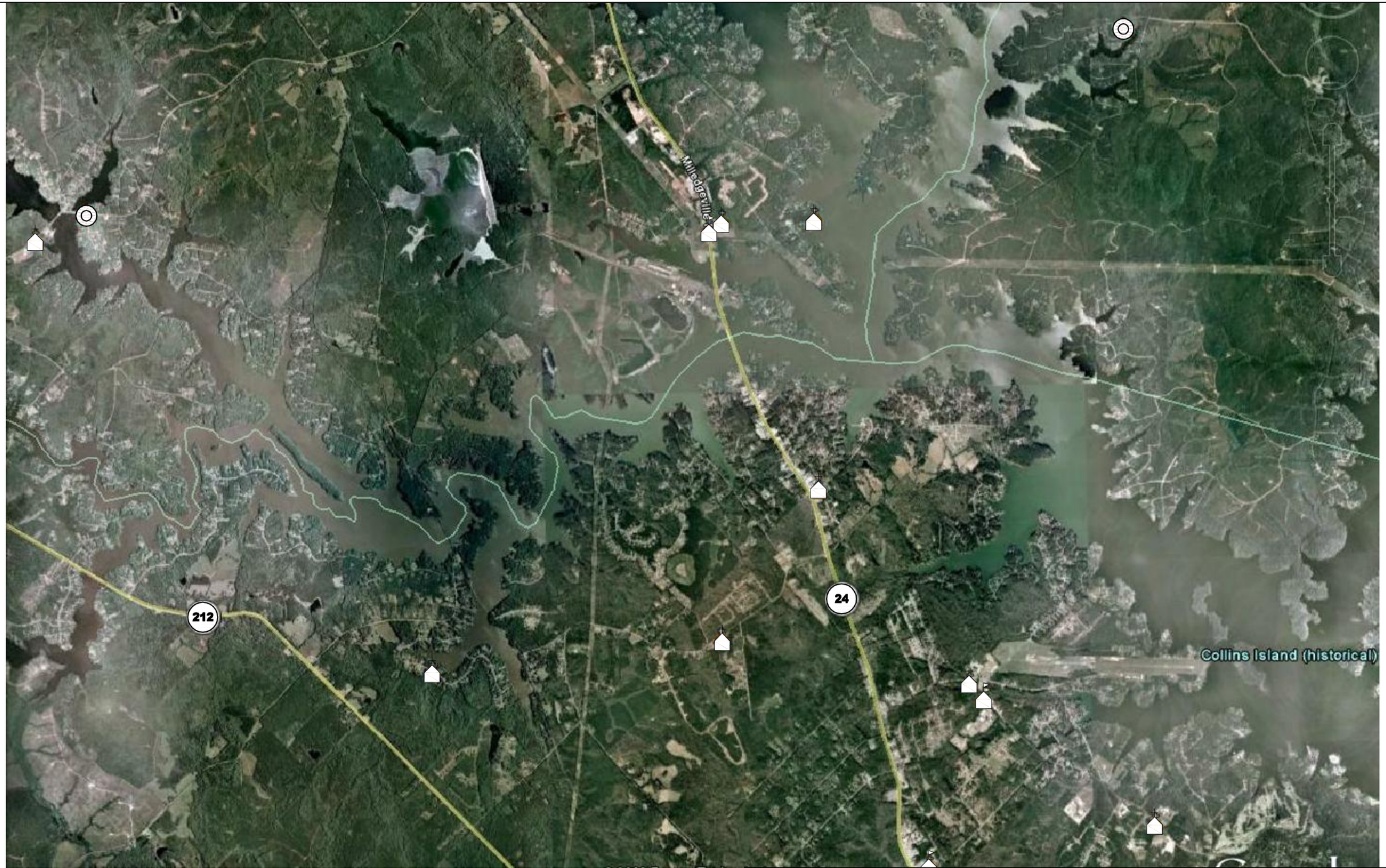

IMAGE REFERENCE: GOOGLE EARTH, IMAGE DATED JUNE 17, 2006.

LEGEND

23 STREET, HIGHWAY

FIRE DEPARTMENT

SCHOOL

CHURCH

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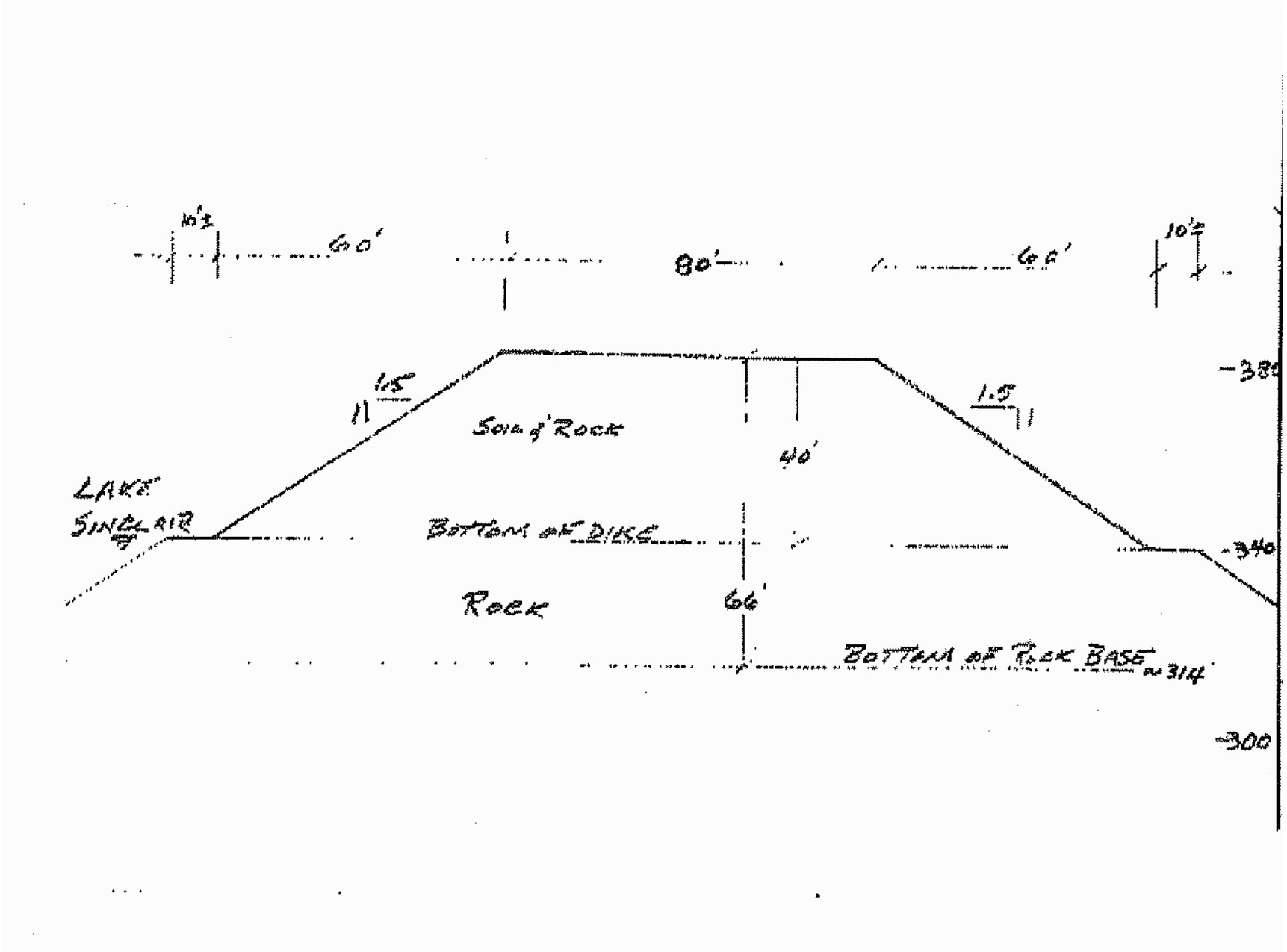
CRITICAL INFRUSTRUCTURE MAP

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 3



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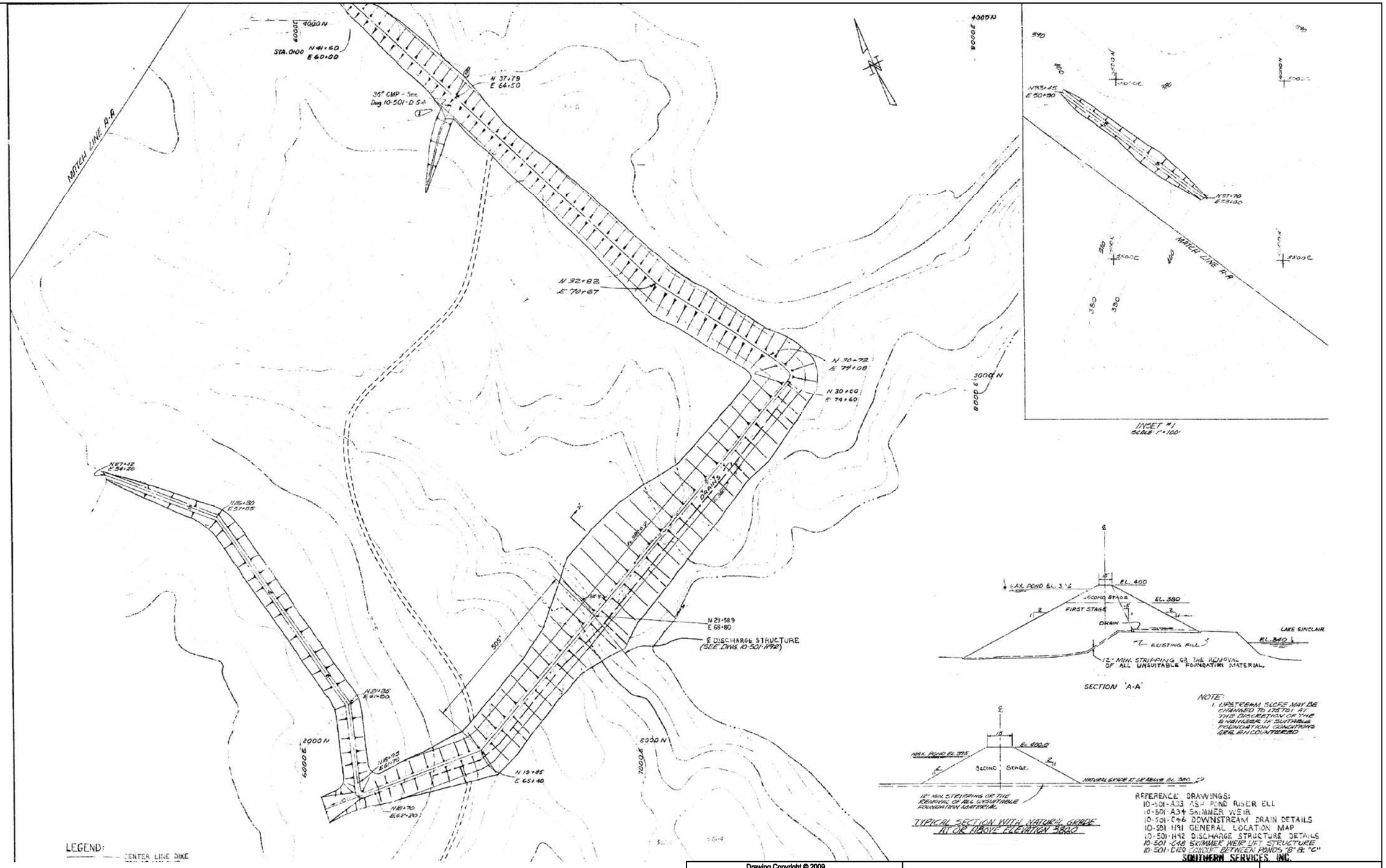
ASH POND B DIKE CROSS SECTION

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 5A



SECTION 'A-A'

NOTE:
1. UPSTREAM SLOPE MAY BE CHANGED TO 2.5 TO 1.0 AT THE DISCRETION OF THE ENGINEER IF SUITABLE FOUNDATION CONDITIONS ARE ENCOUNTERED.

TYPICAL SECTION WITH NATURAL SLOPE AT OR ABOVE ELEVATION 380

REFERENCE DRAWINGS:
10-501-A33 ASH POND RISER ELL
10-501-A34 SKIMMER WEIR
10-501-C46 DOWNSTREAM DRAIN DETAILS
10-501-H91 GENERAL LOCATION MAP
10-501-H92 DISCHARGE STRUCTURE DETAILS
10-501-C48 SKIMMER WEIR LIFT STRUCTURE
10-501-D120 CONDUIT BETWEEN PONDS "B" & "C"

SOUTHERN SERVICES, INC.

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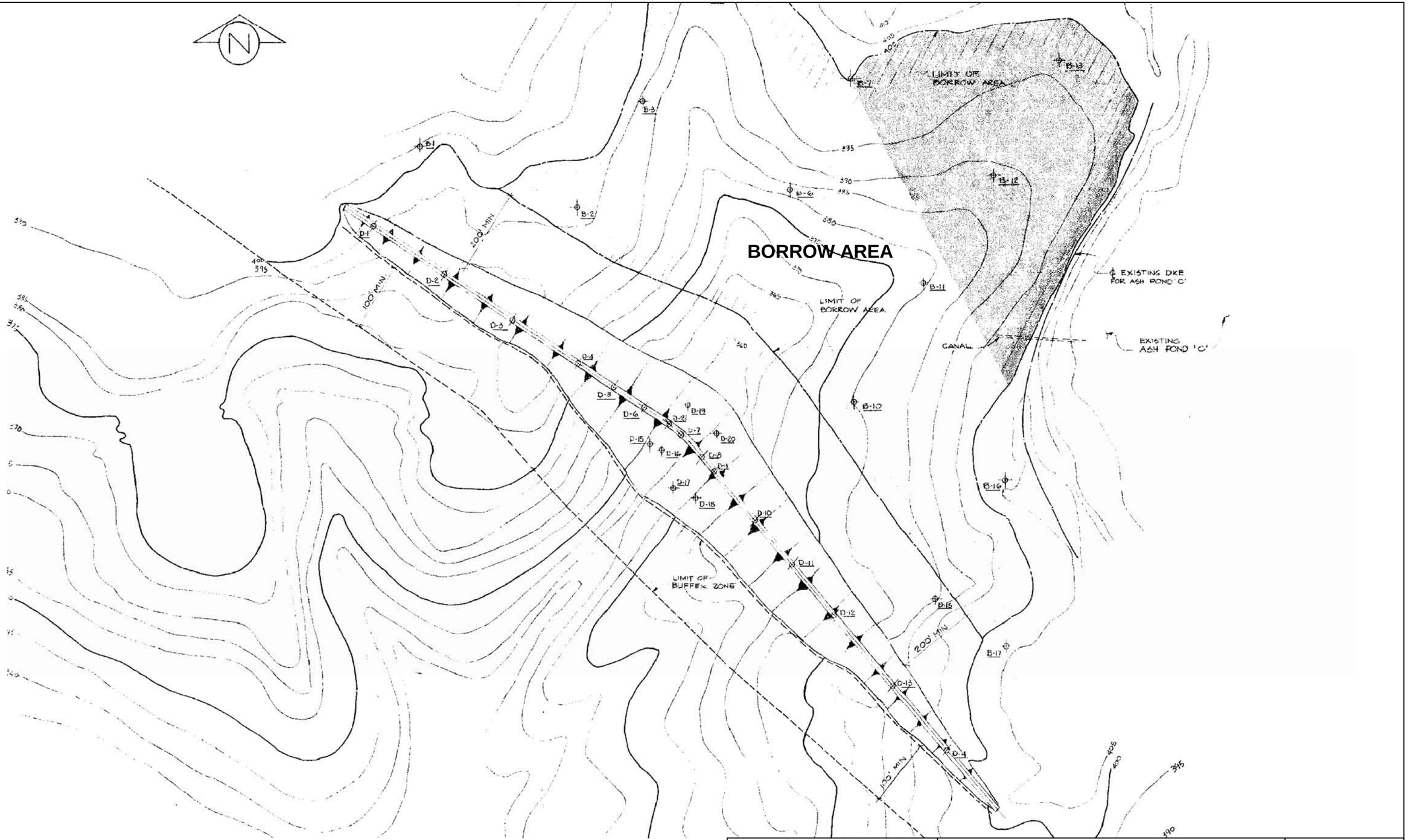
ASH POND C DIKE PLAN & CROSS SECTION

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 5B



Drawing Copyright © 2009

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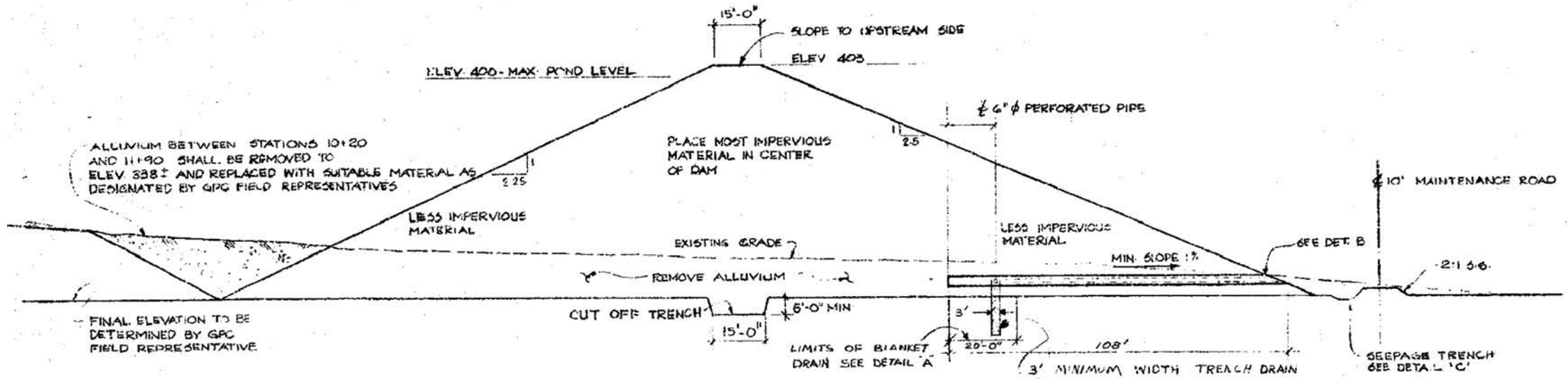
ASH POND D DIKE PLAN

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

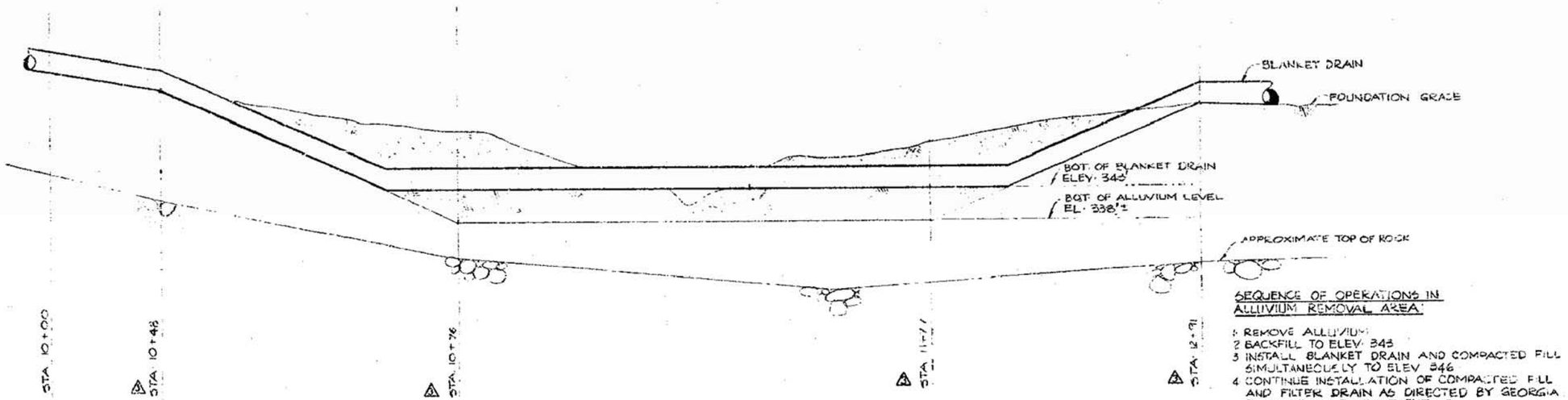
DATE: 12/2009

FIGURE 5C



TYPICAL SECTION THRU DAM SHOWING FINGER DRAIN AND REMOVAL OF ALLUVIUM

3' MINIMUM WIDTH TRENCH DRAIN SHALL EXTEND FROM STA. 8+50 TO 10+90 AND FROM STA. 12+00 TO 13+00 ONLY. TRENCH DRAIN SHALL BE 10' DEEP FROM 8+50 TO 10+51 AND 9' DEEP FROM STA. 12+75 TO 13+00. BETWEEN STA. 10+51 AND 12+75 THE TRENCH DRAIN EXTENDS DOWN INTO THE PARTIALLY WEATHERED ROCK ZONE UNDERLYING THE DAM. ⚠



SEQUENCE OF OPERATIONS IN ALLUVIUM REMOVAL AREA

1. REMOVE ALLUVIUM
2. BACKFILL TO ELEV. 343
3. INSTALL BLANKET DRAIN AND COMPACTED FILL SIMULTANEOUSLY TO ELEV. 346
4. CONTINUE INSTALLATION OF COMPACTED FILL AND FILTER DRAIN AS DIRECTED BY GEORGIA POWER FIELD REPRESENTATIVE.

SECTION ALONG ℄ OF DAM STA. 10+20 TO STA. 11+90 SHOWING REMOVAL OF ALLUVIUM

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ASH POND D DIKE SELECTED SECTIONS

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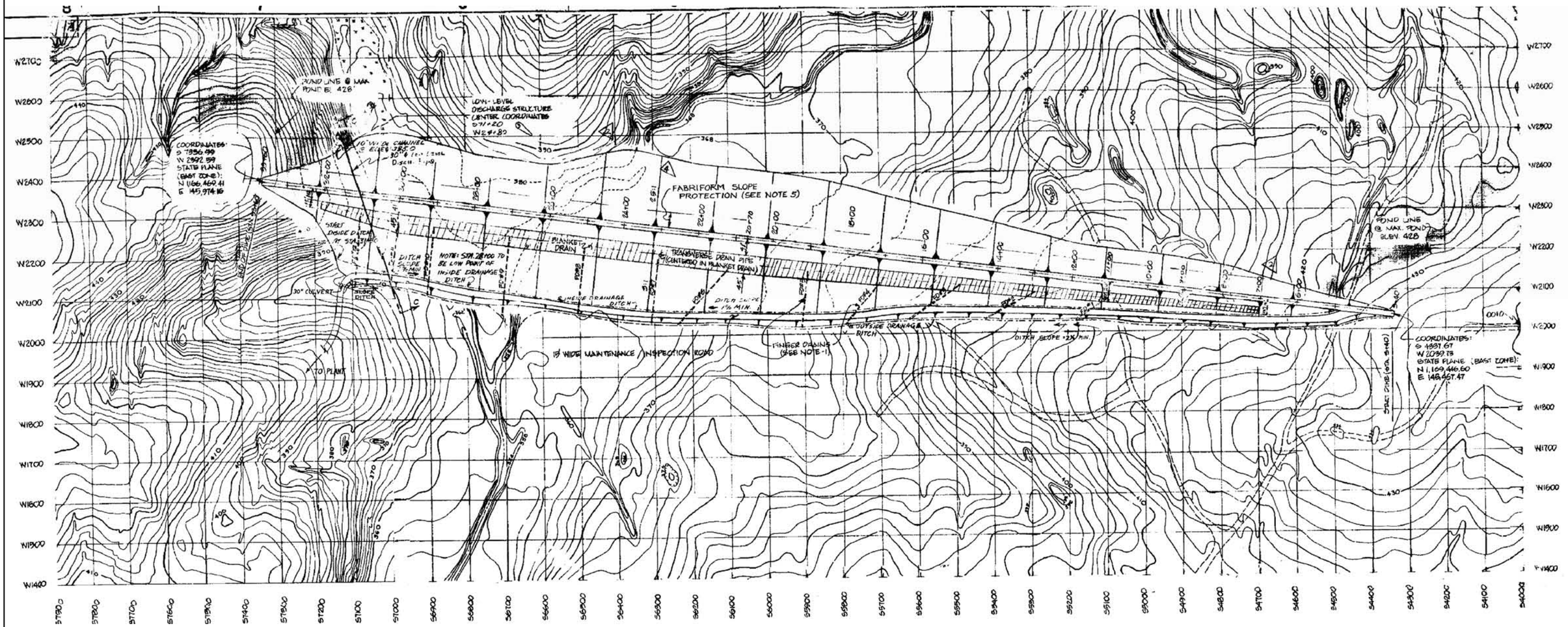
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 5D



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ASH POND E DIKE PLAN

PLANT BRANCH
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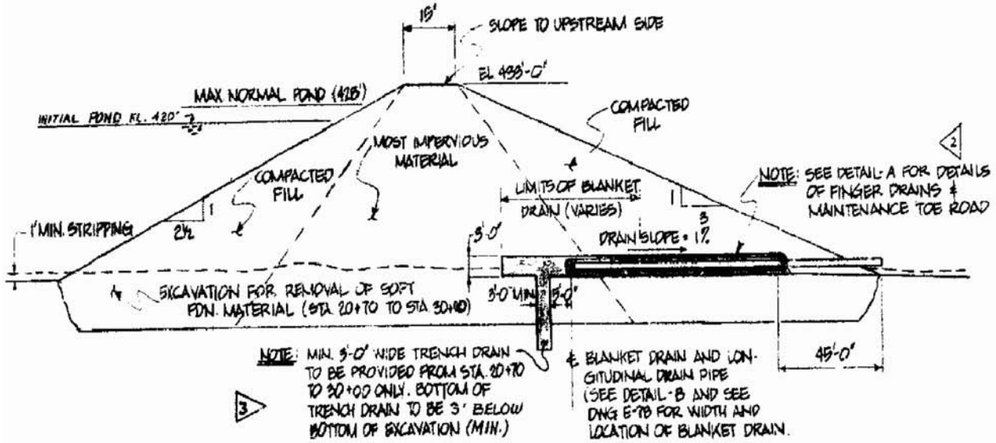
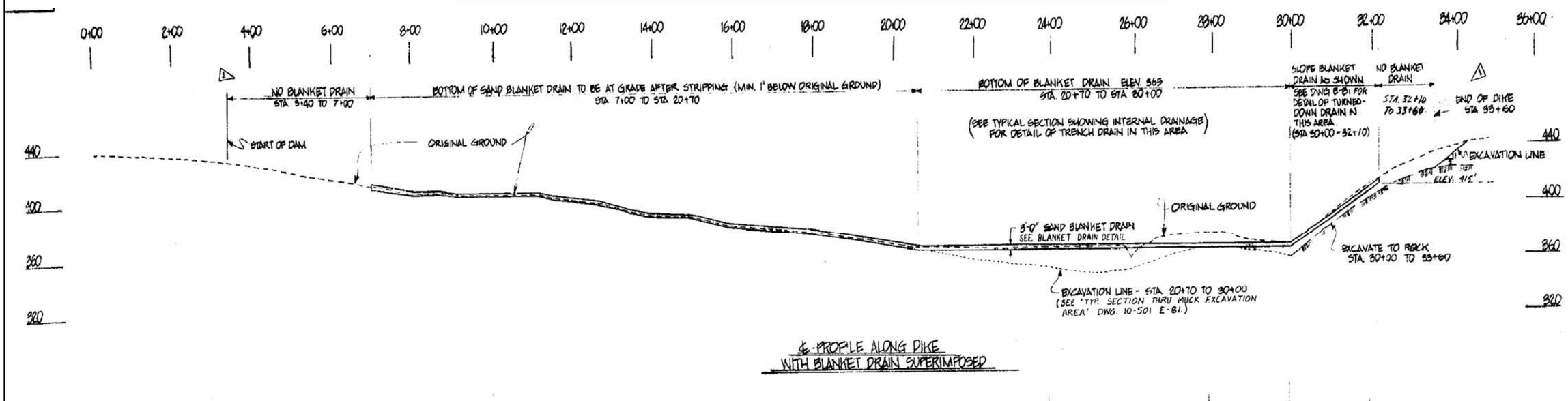
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 5E



TYPICAL SECTION SHOWING INTERNAL DRAINAGE
NTS



℄ PROFILE ALONG DIKE WITH BLANKET DRAIN SUPERIMPOSED

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ASH POND E DIKE SECTION AND PROFILE

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 5F

2.0 FIELD ASSESSMENT

2.1 Visual Observations

CHA performed visual observations of all dikes at the Georgia Power Plant Branch Coal Combustion Facility following the general procedures and considerations contained in FEMA's Federal Guidelines for Dam Safety (April 2004), and FERC Part 12 Subpart D to make observations concerning settlement, movement, erosion, seepage, leakage, cracking, and deterioration. A Coal Combustion Dam Inspection Checklist Form, prepared by the US Environmental Protection Agency, was completed on-site during the site visit for each ash pond. A copy of the completed form was submitted via email to a Lockheed Martin representative approximately three days following the site visit to Plant Branch. A copy of this completed form is included in Appendix A. A photo log of photos taken during the site visit and a Site Photo Location Map, Figure 9, are also located at the end of Chapter 2.

CHA's visual observations were completed on November 23 and 24, 2009. The weather was partly cloudy and temperatures ranged between 54 to 59 degrees Fahrenheit. Prior to and during the days we made our visual observations, the following approximate rainfall amounts occurred (as reported by www.weather.com).

Table 1 - Approximate Precipitation Prior to Site Visit

Dates of Site Visits – November 23, 2009 & November 24, 2009		
Day	**Date**	**Precipitation (inches)**
Monday	11/16/09	0.00
Tuesday	11/17/09	0.12
Wednesday	11/18/09	0.00
Thursday	11/19/09	0.00
Friday	11/20/09	0.00
Saturday	11/21/09	0.00
Sunday	11/22/09	0.57
Monday	11/23/09	0.00
Tuesday	11/24/09	0.00
Total	**Week Prior to Site Visit (16^{th}-22^{nd})**	**0.69**
Total	**Month of November**	**3.94**

It should also be noted that saturated soils were observed throughout the entire Plant Branch facility and assumed to be due to recent rainfall activity.

2.2 Embankments and Crest

As previously described in Section 1.3, the Georgia Power Plant Branch facility utilizes a total of four ash ponds and has one historic ash pond that has been closed. Observations at these ponds and their embankments are described in the following sections.

2.2.1 Ash Pond B

Selected photos of Ash Pond B are included in Photos 65 through 72. Slightly over one-half of the southern area of the original Ash Pond B has been filled with bottom ash, covered with top soil, and vegetative cover as shown in Photo 65. This pond is impounded by a dike on the southwest side and natural hills on the remaining sides.

During the site visit, heavy vegetative cover including large trees and large boulders were noted as being present along the downstream edge of the dike and along the toe as shown in Photos 66 through 68. Heavy tree cover was also observed along the east end of the upstream edge of the dike and on top of the filled in area of the pond. Representatives of Georgia Power stated that is was their opinion that due to an "over" constructed dike and the southern portion of the pond being filled with bottom ash and capped, the trees along the edge of the crest would not pose any impact to the stability of the existing dike.

In general, the dike does not show signs of changes in horizontal alignment and the dike did not exhibit obvious signs of distress (i.e. significant sloughing, bulging, or apparent leakage). With exception of the large boulders present along the downstream face of the dike, the embankment is uniform and covered with heavy vegetative cover including trees. The upstream edge of the pond is difficult to differentiate from the filled area of the pond on the south end due to uniform

grass cover. An area approximately 500 wide by 500 long (square), at the southwest end of the pond is currently covered with only grass cover. The remaining portion of Ash Pond B that is filled with bottom ash is covered with both grass and trees.

The north end of Ash Pond B remains in use for disposing and processing sluiced bottom ash (Photo 72). Based upon aerial photo mapping shown in Figure 2B and available site plans, this open pond area at the north end is roughly 1,100 feet from the original impounding dike structure and roughly 900 feet from the now abandoned outlet structure at its closest point. As indicated by Georgia Power personnel, future plans may include an updated delineation of the actual pond boundaries due to filled and capped portions of the original pond limits. The intent would be to effectively declassify the dike as an impounding structure and remove the dike from any such inventory.

2.2.2 Ash Pond C

Ash Pond C is impounded by three main dikes (west, south, and east dikes) and is currently used as the third stage of the fly ash settlement and water recycling process at Plant Branch. Much of Ash Pond C has silted in with ash over the years such that only the south dike actively impounds open water along its entire length as shown in Figure 2C. Based upon aerial photo mapping and available site plans, roughly 900 feet of the west dike has been silted in as measured from its northern extent, leaving about 330 feet of its southern reach to impound open water. There is roughly 700 feet of the east dike actively impounding open water and about 900 feet that has been silted in from the northern end. Selected photos are included in Photos 31 through 64.

In general, the west, south, and east dikes do not show signs of changes in horizontal alignment and the dikes did not exhibit obvious signs of distress (i.e. significant sloughing, bulging, or apparent leakage). According to Georgia Power personnel, the crest is re-graded as needed to fill in tire ruts thereby reducing ponding of storm water on the crest. The embankments are

generally uniform and covered with appropriate grass cover which was freshly mowed prior to our site visit. Exceptions on the west and south dikes are described below.

2.2.2.1 Ash Pond C West Dike

During the site reconnaissance of the west dike, a historic discharge system was observed at the south end (Photos 31 and 32). This was originally constructed as the primary outfall via a gravity feed to a treatment facility before the water was recycled or discharged to the lake. It was later replaced with a siphon at this location to provide an emergency outlet should the need arise. This was done around the same time the primary siphon system conveying water to the Pond B was installed. Georgia Power indicated that the historic discharge system facility has been decommissioned; however the plant maintains an NPDES discharge permit at this location.

Two areas located along the west dike near the south central portion of the dike were observed to have pooled water and saturated soil (Photo 34). It was not readily discernable if these areas were due to poor drainage from recent rains. No information was provided from Georgia Power personnel regarding these areas of saturated soil.

Several apparent areas of sparse vegetation were noted along the central and northern exterior portion of the west dike (Photo 35). These areas appeared to be caused by mowers slipping down the exterior face of the dike. Additionally, few rodent burrows were observed along the length of the dike (Photo 37).

2.2.2.2 Ash Pond C South Dike

The downstream face of the south dike has been "re-faced" with rip-rap as shown in Photos 55, 57, and 60. It is understood that this has been an on-going process over the last few years in effort to alleviate past minor slope sloughing and was implanted in effort to alleviate future slope scarping or sloughing.

Photo 42 shows scarping caused by pond water "lapping" along the upstream side of the south dike. The rock rip-rap facing along the edge did not appear to be properly maintained and was scattered. Several stormwater drains were observed on the dike crest which appear to need maintenance.

Additionally, upon reviewing the south dike from its toe, several "wet" areas approximately three feet in diameter were observed along the east end of the toe as shown in Photo 56. Examination of the "wet" areas indicated that a portion of the drainage system installed below the downstream slope may have been buried beneath recent expansion of the toe along the south dike. Seepage drains SD1-SD3 were observed to produce clear water as shown in Photos 62 and 63. This water was released directly onto the native soils adjacent north of Lake Sinclair.

2.2.2.3 Ash Pond C East Dike

"Re-facing" was being performed in a section of the downstream face of the south portion of the east dike as shown in Photo 46. This area is located south of the "recycle water" station, located near the center of the dike. The re-facing of the section on the east dike entailed the same procedures used along the south dike exterior facing. Tall grass was observed along the upstream side of the dike as shown in Photo 49.

Saturated soil and standing water was noted to the north of the "recycle water" station as shown in Photo 50. Georgia Power personnel explained that the standing water was due to improper drainage in this area and that attempts had been made to place small rock over this area; however, due to saturated soils the imported rock was pushed beneath the soil surface by heavy machinery. Attempts to remediate this area were halted until the soil dried enough for future work to proceed.

The visual review of the east dike revealed an area with deformation along the north upstream face of the dike (Photo 53). The deformation appeared to be created from mowing performed

along consistent lines. Additionally, there were a few rodent burrows located along the north portion of the dike's upstream edge.

Inconsistencies in the dike's downstream face were also noted along the south end as shown in Photo 54. These variations in the face of the slope appeared to be the initial formation of erosion rills beneath the vegetation currently present on the slope.

2.2.3 Ash Pond D

The visual review of the west dike at Ash Pond D, also called Ash Pond D-1 in documents prepared by others, did not reveal signs of changes in horizontal alignment and the dike did not exhibit obvious signs of distress (i.e. significant sloughing, bulging, or apparent leakage). Selected photos of Ash Pond D are included in Photos 17 through 30.

Upon inspection of the dike from the crest, a widening of the dike was noted along the northern end as shown in Photo 22. Georgia Power personnel indicated that this is due to the buildup of fly ash along the interior edge of the dike which has slowly filled the pond as shown in Figure 2D. Based upon aerial photo mapping and available site plans, roughly 1,400 feet of the Pond D dike structure has silted in and no longer actively impounds water as measured from the northern end of the dike. Only about 600 feet of the dike now retains open water and this section of the dike has developed a stand of aquatic vegetation at the pond dike interface over time. Additionally, several rodent borrows (Photo 19) were located along the upstream edge of the dike.

The drainage system for Ash Pond D is comprised of a concrete lined drainage channel along the dike's toe receiving water from the seepage drains at the base of the dike as shown in Photos 23 and 29. Georgia Power personnel indicated that a section of the concrete lined drainage channel located along the north central portion of the dike was inadvertently removed (Photo 26). It was explained by members of Georgia Power personnel that previous remediation in this area had

damaged the concrete lined drainage channel and it had not been restored to its original form. They explained that they maintained this area as necessary to allow for proper drainage. The seepage drains for Ash Pond D were observed to produce clear water. Several of the drains did not appear to discharge water. Information provided by Georgia Power personnel indicated that this was due to the existing grading and plumbing locations for the seepage drainage system.

Along the central portion of the downstream face of the dike, an area roughly ten feet wide by twenty feet long was observed to be covered with rock (Photo 25). Based upon information provided by Georgia Power personnel, it is understood that the existing rock was installed in effort to remedy seepage at this location. West of this area and across the existing travel road was an area of rock approximately 25 feet in diameter covered with 2 to 4 inch gravel (Photo 27). It was indicated by member of Georgia Power that this area was known to be a soft area and had been covered with rock as a means of remediation.

2.2.4 Ash Pond E

The visual review of the dike at ash pond "E" did not reveal signs of changes in horizontal alignment and the dike did not exhibit obvious signs of distress (i.e. significant sloughing, bulging, or apparent leakage). Selected photos of Ash Pond E are included in Photos 1 through 16.

However, three "soft" areas of saturated soils were observed east of the lower concrete lined drainage channel. These areas have been previously recognized by members of Georgia Power and they have been delineated using wooden stakes (Photos 5 and 10). These areas are regularly reviewed for any changes during inspections. As indicated by Georgia Power personnel, these areas have remained as originally recognized over at least the last 9 years, based upon specific references to these areas in quarterly reports dating to the latter part of 2000. It is also possible that some of these areas may actually be older, based upon non specific references to downstream seeps dating back to the time the impoundment was initially filled in 1985.

The finger drains observed along the toe of the dike appeared to produce clear water and discharged directly in the concrete lined drainage channel as shown in Photo 6. The channel also collects surface run-off.

The wave wall installed along the upstream edge of the dike's crest appeared to be slightly unaligned. Based upon information provided by members of Georgia Power, the wave wall was constructed exactly as it remains today due to the fabriform being slightly out of line. The engineered design required that the footing for the wave wall be installed directly adjacent to the fabriform, which had been installed without proper alignment.

A small area of sloughing was noted along the south central portion of the dike adjacent west of the lower concrete channel along the toe as shown in Photo 8. The area determined to be sloughing appeared to be due to recent rainfall activity.

A few areas along the downstream face and crest of the dike were observed to have sparse vegetation. The majority of these areas appeared to be due to slippage along the face of the dike by mowers as shown in Photos 13 and 14. Several areas were also noted as having a variation in the existing grass on the dike face. Based upon information provided by Georgia Power personnel, these areas were seeded with "rye grass" to provide vegetative cover during the winter months, which would be reseeded with the appropriate grass cover in the spring. With this exception, the remainder of the grass cover appeared to be uniform. Some very minor rutting or tracking was also observed along the face of the dike which also appeared to be due to current mowing practices.

2.3 Outlet Control Structure and Discharge Channel

2.3.1 Normal Operating Pool Outlet Structures

The water at Plant Branch loops in a semi-closed system as described below:

- Fly ash is sluiced to Ash Pond E.
- Water is decanted from Ash Pond E and to Ash Pond D. The outlet structure from Ash Pond E is a rectangular reinforced concrete riser structure configured to operate with stop logs to regulate the pond level (Photo 15). The riser is connected to a buried 36-inch-diameter pipe.
- Water decants from Ash Pond D and flows through an open concrete lined channel (Photo 40) into Ash Pond C. The channel is located along the southeast side of Ash Pond D.
- Water is siphoned from Ash Pond C to Ash Pond B (Photos 46, 47, and 48).
- Bottom ash is sluiced into Ash Pond B.
- Water from Ash Pond B is conveyed to the plant via a vacuum siphon line. It is manually controlled with a valve in the generating facility.

Based upon Drawing E126 prepared by Southern Company in 1995 regarding the Ash Pond C decant structure, we understand that the 42-inch-diameter outlet pipe extending below the dike was filled with concrete and abandoned in place. It is unclear if the drop inlet riser was left in place.

2.3.2 Emergency Outlet Structures

The emergency overflow for Ash Pond E is an earthen formed channel (Photo 16) located along the south east portion of the pond. Vegetation present along the spillway had not been recently cut and appeared to be uniform.

A historic emergency discharge system was observed at the south end of the Ash Pond C west dike. However, this facility has been decommissioned and is no longer in use per Georgia Power personnel.

The emergency spillway for Ash Pond B is an earthen spillway (Photo 70) located along the western boundary of the pond. It primarily functions to collect stormwater runoff from the closed capped portion of Ash Pond B and surrounding terrain. The spillway drains directly into a coated corrugated metal pipe located at the southwest corner of the pond that conveys collected water beneath the embankment crest and beyond the dam. From that point water flows across the terrain to the south and discharges directly into Lake Sinclair.

2.4 Monitoring Instrumentation

The following sections present the instrumentation data collected at Ponds C, D, and E. CHA was not provided with information regarding instrumentation at Ash Pond B.

2.4.1 Ash Pond C

Instrumentation at Ash Pond C includes six piezometers installed along the dikes and three seepage weirs at the approximate locations shown on Figure 6A. Three piezometers (PZ1 through PZ3) are installed near the center of the south dike and three piezometers (PZ4 through PZ6) are installed near the center of the west dike. Figure 6B shows a plot of Ash Pond C piezometer levels and Figure 6C shows a plot of Ash Pond C seepage weir flow rates from January 1998 through October 2009.

2.4.2 Ash Pond D

There are a total of sixteen piezometers installed at Ash Pond D at the approximate locations shown on Figure 7A. Eight piezometers (A1 through G1, and G1A) are located at the toe, seven piezometers (H1 through L1, and S1) are located on the dike crest, and two piezometers (M1 and N1) are located downstream of the dike. Information for Piezometer S2 is provided in the plots, however the location of this instrument is not shown on the location plan provided. Figures 7B and 7C show plots of the piezometer levels from January 1998 through October 2009.

The Ash Pond D dike is also monitored by four seepage drains. Figure 7D shows a plot of the flow rates at two of the drains, SD2 and SD3, from January 1998 through October 2009.

2.4.3 Ash Pond E

Nineteen piezometers have been installed at Ash Pond E east dike at the approximate locations shown on Figure 8A. Eight piezometers (PZ1 through PZ8) are located within the dike structure primarily near the center and southern portion of the dike. Eleven piezometers (PZ9 through PZ 19) are located adjacent and east of toe. Figures 8B and 8C show plots of the piezometer levels at Ash Pond E from January 1998 through October 2009.

Figure 8A shows the location of seven deformation and settlement monuments (SM1 through SM7). Data has not been provided for the instruments.

Figure 8D also shows the location of 12 finger drains (FG1 through FG11, and FG9A) and 10 relief wells (W1 through W10). Flow rate information at the finger drains is provided in Figures 8E and 8F. Flow rate information at the relieve wells is provided in Figures 8G and 8H.

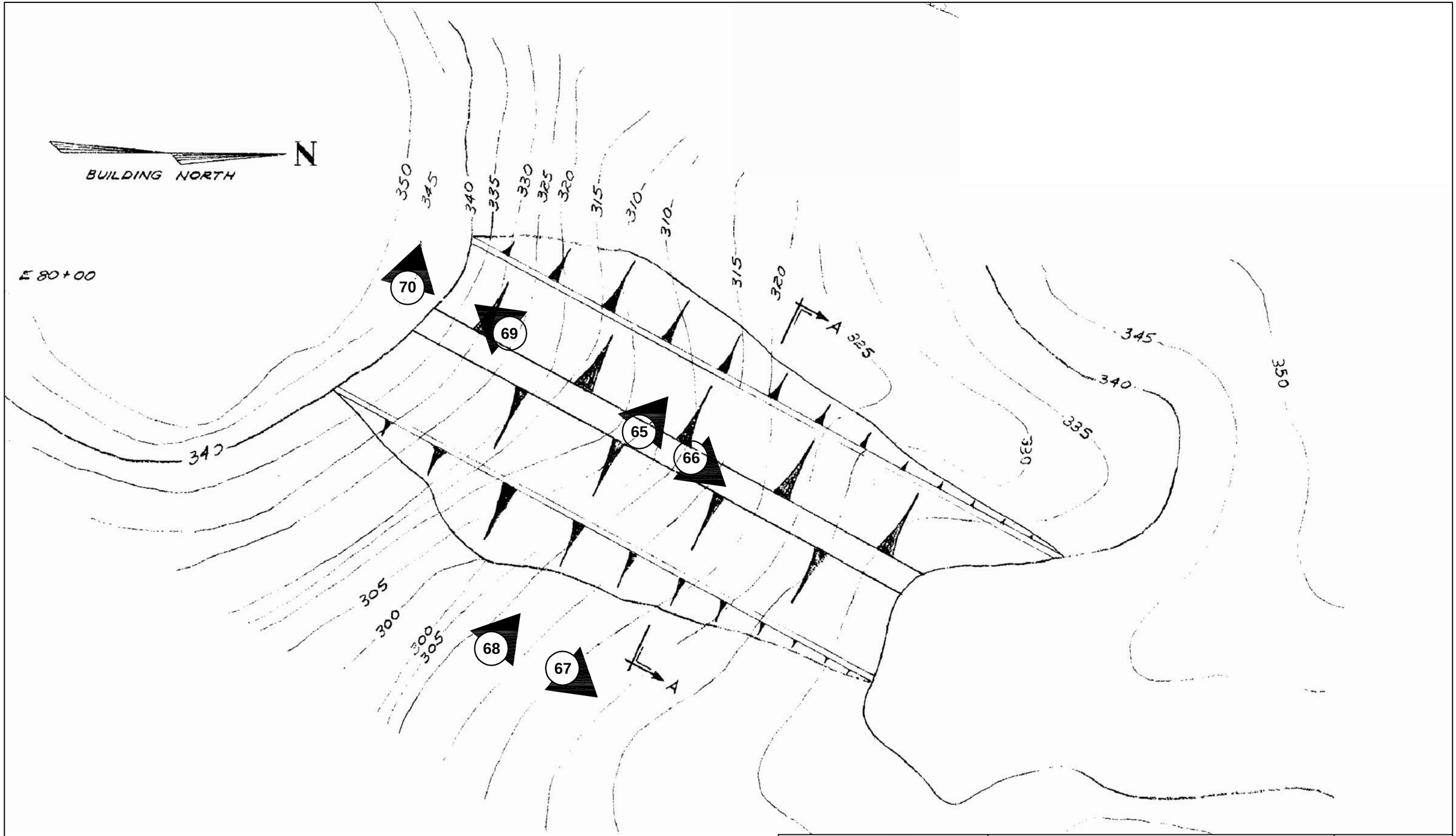

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PHOTO LOCATION PLAN – ASH POND B

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DATE: 12/2009

FIGURE 4A

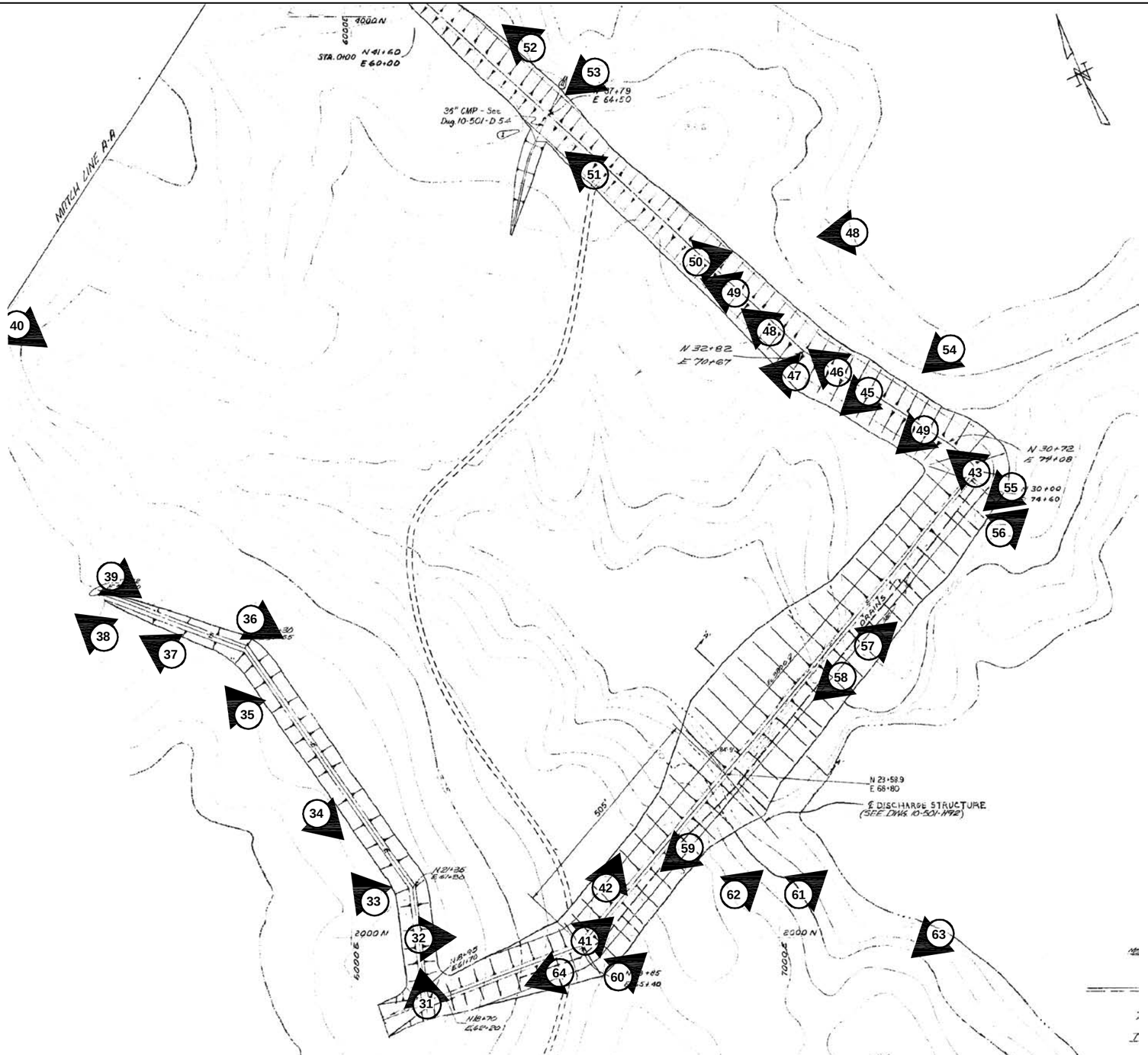

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PHOTO LOCATION – ASH POND C

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FIGURE 4B

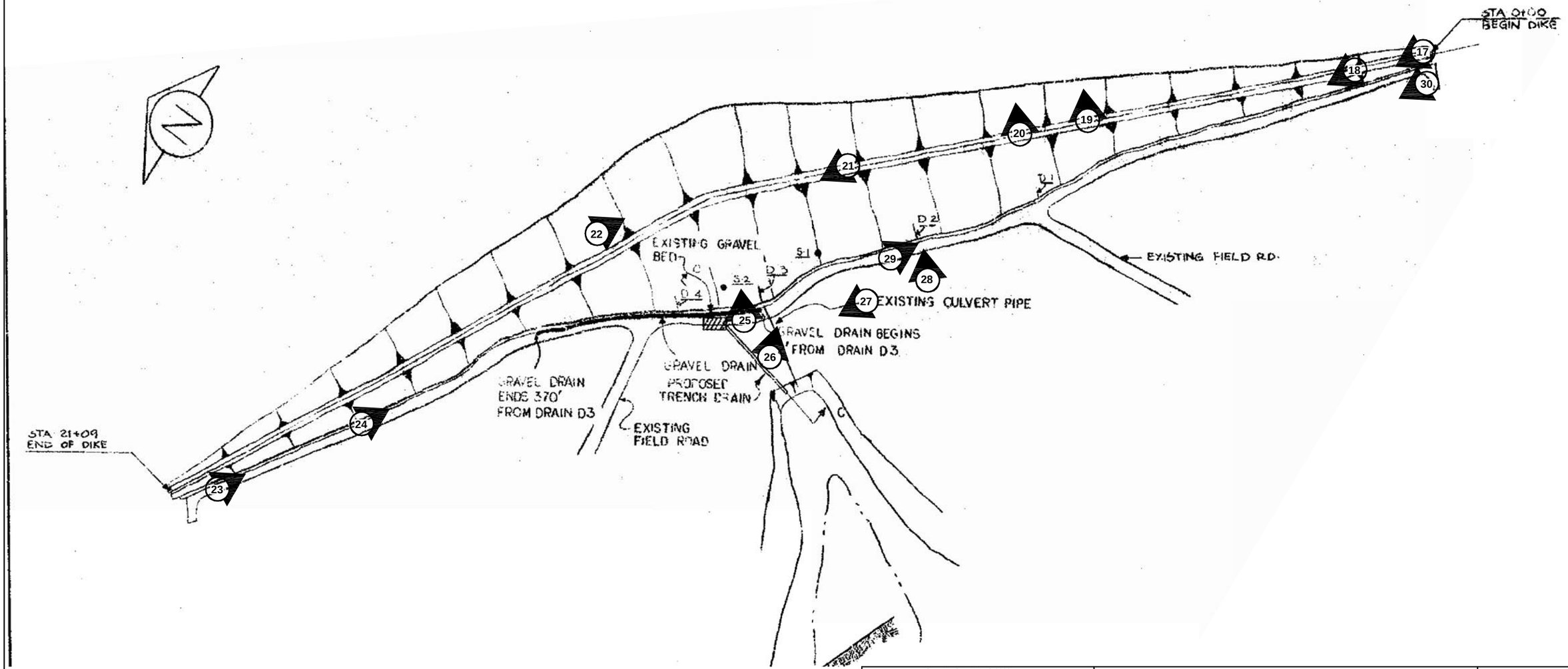

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PHOTO LOCATION PLAN – ASH POND D

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FIGURE 4C

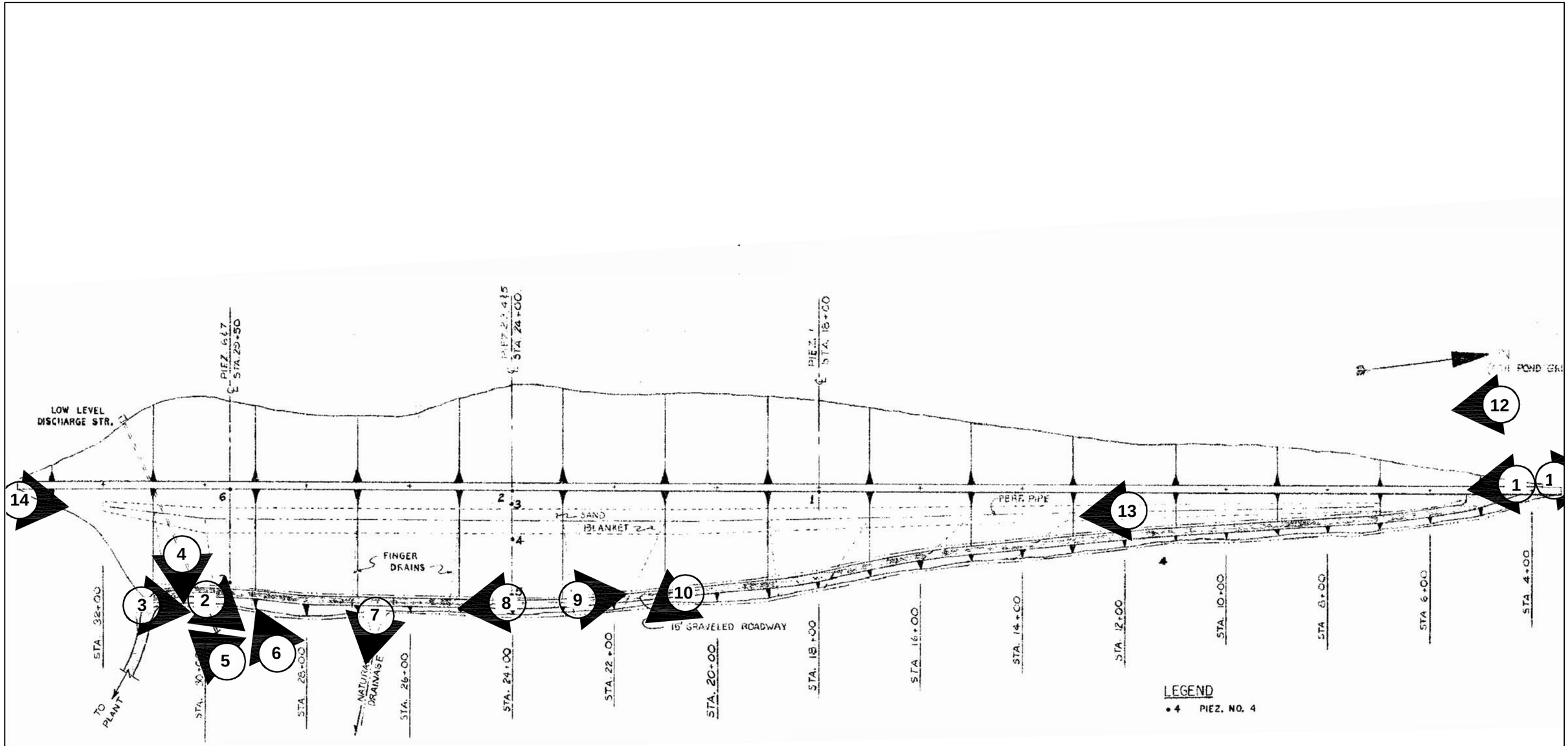

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PHOTO LOCATION PLAN – ASH POND E

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FIGURE 4D

1

Northern end of Ash Pond E dike crest, facing south.

2

Ash Pond E abandoned overflow drain located along southern portion of the dike.
The drain pipe is constructed of welded steel.

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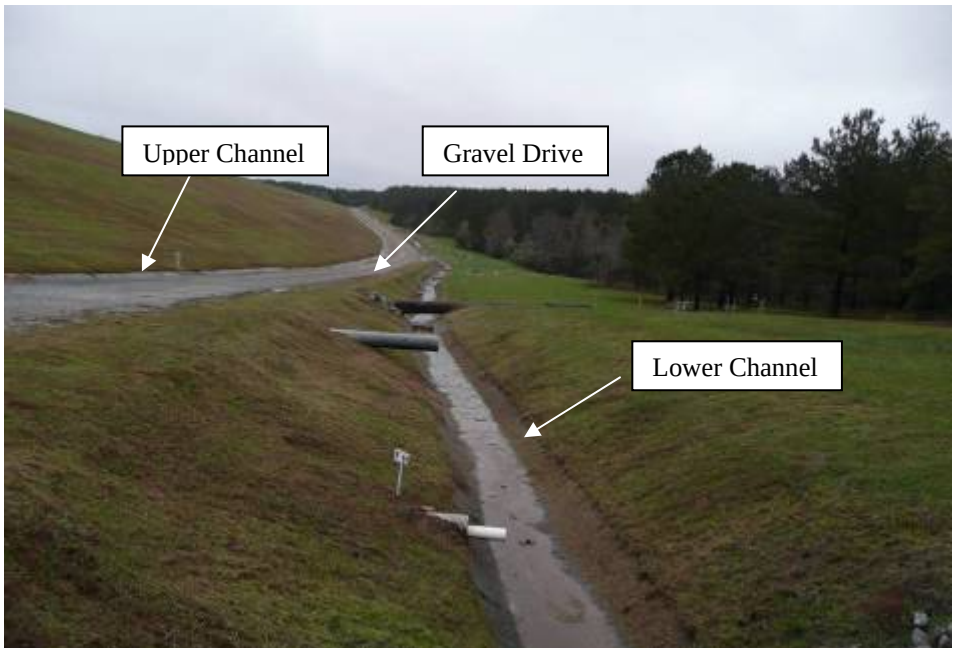
CHA Project No.: 20085.2060.1510	November 23, 2009

3



Ash Pond E, south dike toe, facing north. Drainage system shown.
Upper and lower drainage channels are constructed of a concrete lined channel.

4

Corrugated metal drain pipe located north of Ash Pond E finger drain #11. Light can be seen at the western most end of the drain pipe, indicating a clear drainage channel from upper channel drain to lower channel drain.

5

Ash Pond E, "soft spot" located south of emergency overflow drain (1 of 3 observed near Ash Pond E). This area has been monitored for 9 years by Georgia Power with no additional expansion observed. Perimeter stakes have been placed to aid in monitoring.

6

Ash Pond E finger drain #10. Drainage from finger drains observed to be clear.

7

Ash Pond E, receiving stream for drainage from the blanket drain system.

8

Ash Pond E, sloughing observed along west edge concrete line channel at the base of the toe, central portion of the dike.

9

Ash Pond E, concrete lined channel drain at the base of the dike (upper channel).

10

Ash Pond E, 3rd observed "soft spot" located east of finger drain #5. Perimeter stakes installed for all soft spots in effort to monitor expansion. No observed expansion for any of the 3 soft spots in at least 9 years, as indicated by Georgia Power.

11

Ash Pond E, north end of dike, facing north.

12

Ash Pond E, North end of dike, facing south. Shown above, wave wall and rip-rap placement along upstream edge of pond.

13

Ash Pond E, mid-height of dike, northern end of dam facing south. Mower-rutting observed throughout portions of the dike. Rye grass patching observed and indicated to be seasonal grass cover in effort to minimize sparse vegetation.

14

Ash Pond E, south end of dike, facing north.

15

Ash Pond E decant spillway structure.

16

Ash Pond E emergency spillway.

17

Ash Pond D, south edge of dike facing north. Concrete lined drainage channel shown frame left.

18

Ash Pond D, south end of dike facing north. Upstream slope and vegetation in the pond shown frame right.

19

Ash Pond D, animal burrow located along central portion of the dike along the interior edge.
One of several found throughout the length of the dike.

20

Ash Pond D, central portion of the dike facing east.
Interior edge of the dike (pond side) shown with possible ash build up.

21

Ash Pond D, central portion facing north east.

22

Ash Pond D, north edge of dike facing south east. Note widened crest of dike. Crest widening due to build up of ash per Georgia Power personnel.

23

Ash Pond D, north end of dike at edge of toe facing southeast showing concrete lined drainage channel along toe of dike.

24

Ash Pond D, south central portion of dike facing south east at edge of toe. Dike seepage remediation shown by arrow

25

Ash Pond D, central portion of dike at edge of toe. Seepage remediation area shown.

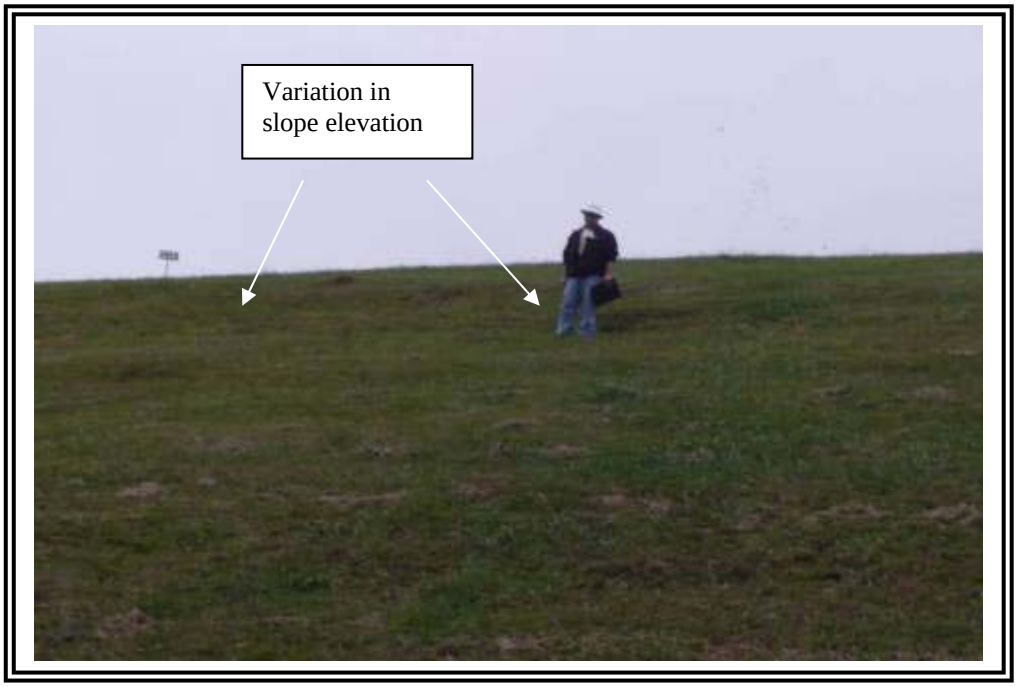
26

Ash Pond D finger drain D-3. Georgia Power personnel indicated that this area was previously remediated and the concrete lined channel was inadvertently razed during remediation.

27

Ash Pond D, central portion of dike, west of toe facing north west. "Soft area" covered with rock indicated by arrow.

28



Ash Pond D, central portion of dike at edge of toe, facing east into the dike. Note dike variation in slope elevation possibly due to scarping or sloughing due to mowing patterns.

29

Ash Pond D, central portion of dike along toe facing south east.
Concrete lined channel drain along toe and finger drains shown frame left.

30

Ash Pond D, south end along toe of dike, facing northwest.

31

Southwest edge of Ash Pond C along west dike crest, facing north. Historic discharge facility shown frame right is no longer in use per Georgia Power personnel.

32

Ash Pond C water level indicated by the gauge at the historic discharge facility (395.0').

33

Ash Pond C emergency overflow located on southern portion of west dike north of historic discharge facility.

34

Central portion of Ash Pond C west dike toe facing south.
One of two “soft spot” s indicated by arrow.

35

Sparse grass cover on north central portion of Ash Pond C west dike toe, facing north.

36

Ash Pond C, upstream dike edge shown at north portion of the west dike, facing south.

37

Ash Pond C, north portion of west dike, rodent burrow observed on upstream side of dike.

38

Ash Pond C, downstream edge of west dike at north end of dike, facing north.

39

Ash Pond C, north end of west dike interior, facing south. Interior edge of dike shown frame left with vegetation present. Exterior edge of dike shown frame right with heavy vegetative cover present.

40

Overflow into Ash Pond C from atop the bridge facing south east.

41

Ash Pond C, west end of south dike facing east.

42

Upstream side of Ash Pond C west end of south dike facing east. Crest run-off drain shown.

43

Ash Pond C, south end of east dike facing north.

44

Ash Pond C, south end of east dike facing west. South east corner of Ash Pond C shown.

45

Ash Pond C, south end of east dike. Historic drain shown.

46

Ash Pond C, south central portion of east dike. Downstream dike re-facing with rip-rap under construction.

47

South central portion of Ash Pond C east dike, upstream slope shown with rip-rap. Re-cycle water system intake shown frame right

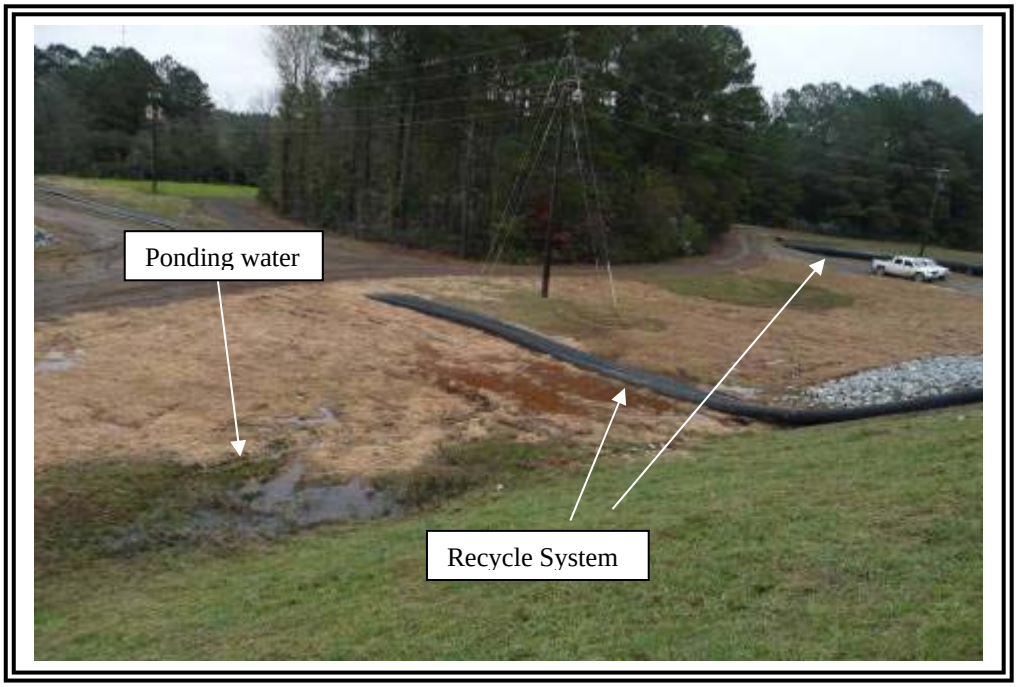
48

Ash Pond C, south central portion of east dike. Recycle water system shown. This system discharges recycle water to Ash Pond B.

49

Central portion of Ash Pond C east dike facing north. Interior pond edge shown with thick and tall vegetative growth.

50



Ash Pond C, central portion of east dike facing east, south east. Ponding water shown frame left. Recycle system plumbing shown frame right.

51

Ash Pond C, north portion of east dike facing north.

52

Ash Pond C, downstream slope at north end of east dike, facing north. Stressed vegetation shown frame right.

53

Ash Pond C, north end of east dike along dike toe, facing west. Dike scarping indicated.

54

Downstream slope of Ash Pond C east dike near the south end showing variations in elevation.

55

Ash Pond C, east end of south dike facing west.
Downstream slope shown with rip-rap facing.

56

Ash Pond C, east end of south dike at the toe, facing east. Two saturated areas shown (several located in this area). Saturated areas possibly due to buried drains.

57

Ash Pond C, central portion of south dike along toe facing east.
Pooled water shown frame left.

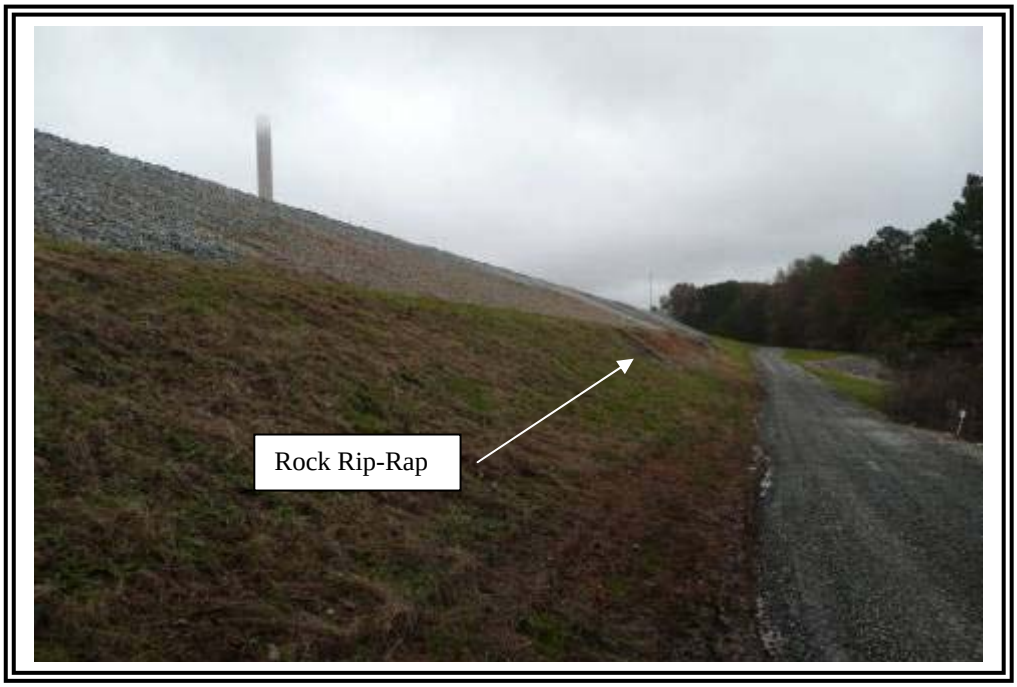
58

Ash Pond C, central portion of south side facing west. Pooled water shown frame right.

59

Ash Pond C, western central portion of south dike facing west. Saturated soil shown.

60



Ash Pond C, western central portion of south dike facing east. Toe re-faced utilizing rock rip-rap.

61

Ash Pond C, western central portion of south dike, facing east, adjacent south of toe.

62

Ash Pond C seepage drain No. 3 shown. Draining water was observed to be clear.

63

Ash Pond C, west end of south dike. Seepage weir shown.

64

Ash Pond C, west end of south dike facing west. Rock rip-rap facing on dike exterior shown.

65

Ash Pond B, central portion of dike crest, facing north into area of pond filled with bottom ash and covered with topsoil.

66

Ash Pond B, central portion of dike facing east. Downstream slope of dike shown frame right with vegetation present. Interior edge of dike shown frame left with vegetation (tree cover) present along eastern end of the pond.

67

Ash Pond B, central portion of dike along the toe facing east. Heavy vegetative growth present and large boulders present throughout. Lake Sinclair shown frame right.

68

Ash Pond B, central portion of dike facing north, along the toe. Exterior of dike shown with large boulders and vegetative growth.

69

Ash Pond B, west end of dike. Emergency spillway (black pipe in background) and abandoned primary discharge facility shown.

70

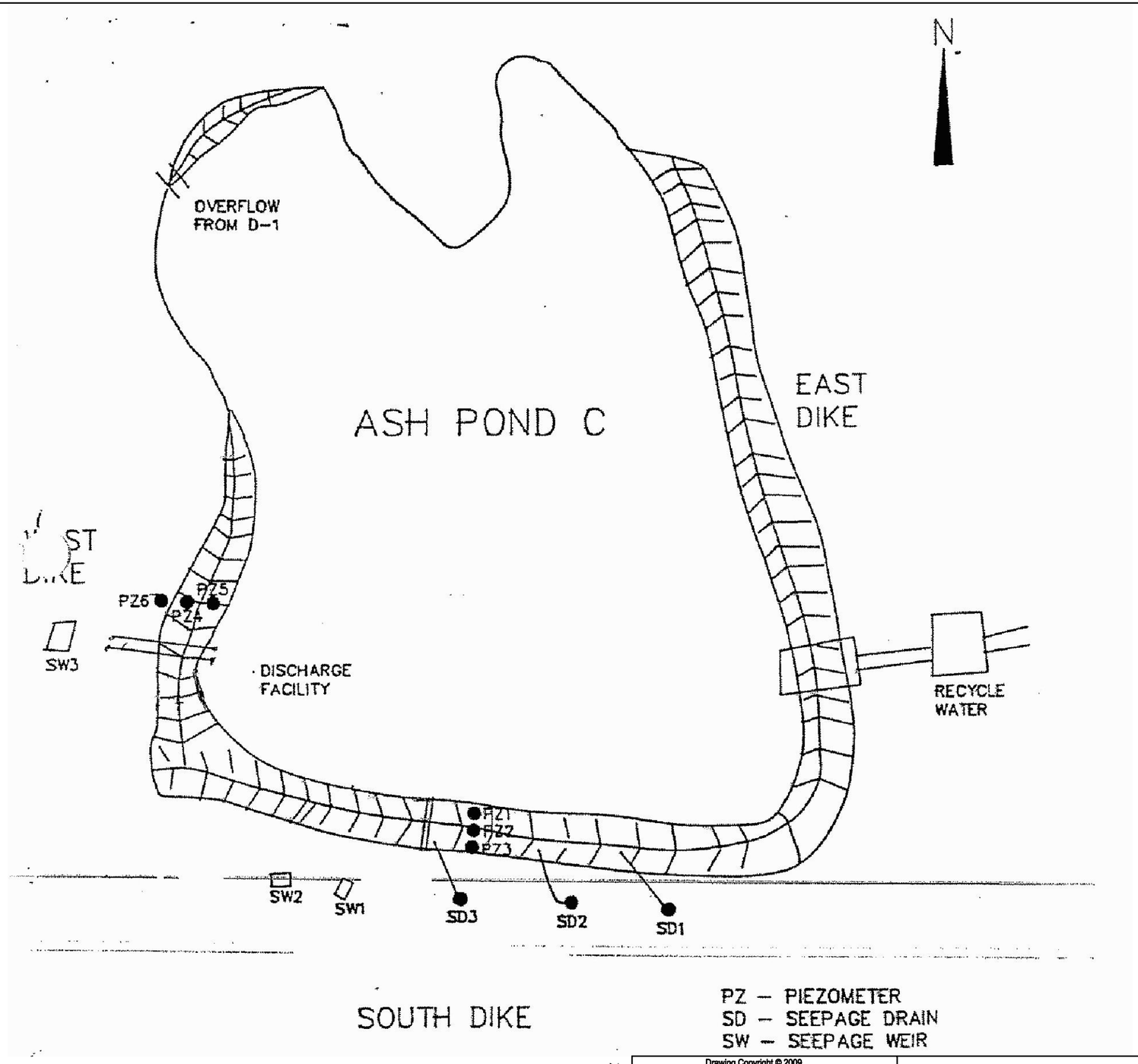
Ash Pond B, west end of dike facing north, at emergency spillway and site drainage open channel. Inlet protection for emergency spillway into discharge facility shown..

71

Ash Pond B, north end of pond along eastern edge facing west. Shown is the portion of Ash Pond B unfilled with bottom ash. Ash processing facility shown frame left.

72

Ash Pond B, north end of pond along eastern edge facing south west. Shown is portion of the pond remaining unfilled with bottom ash. Frame left and furthest shows the area of Ash Pond B filled with bottom ash, covered with topsoil, and vegetative cover.



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ASH POND C INSTRUMENTATION LOCATION PLAN

PLANT BRANCH
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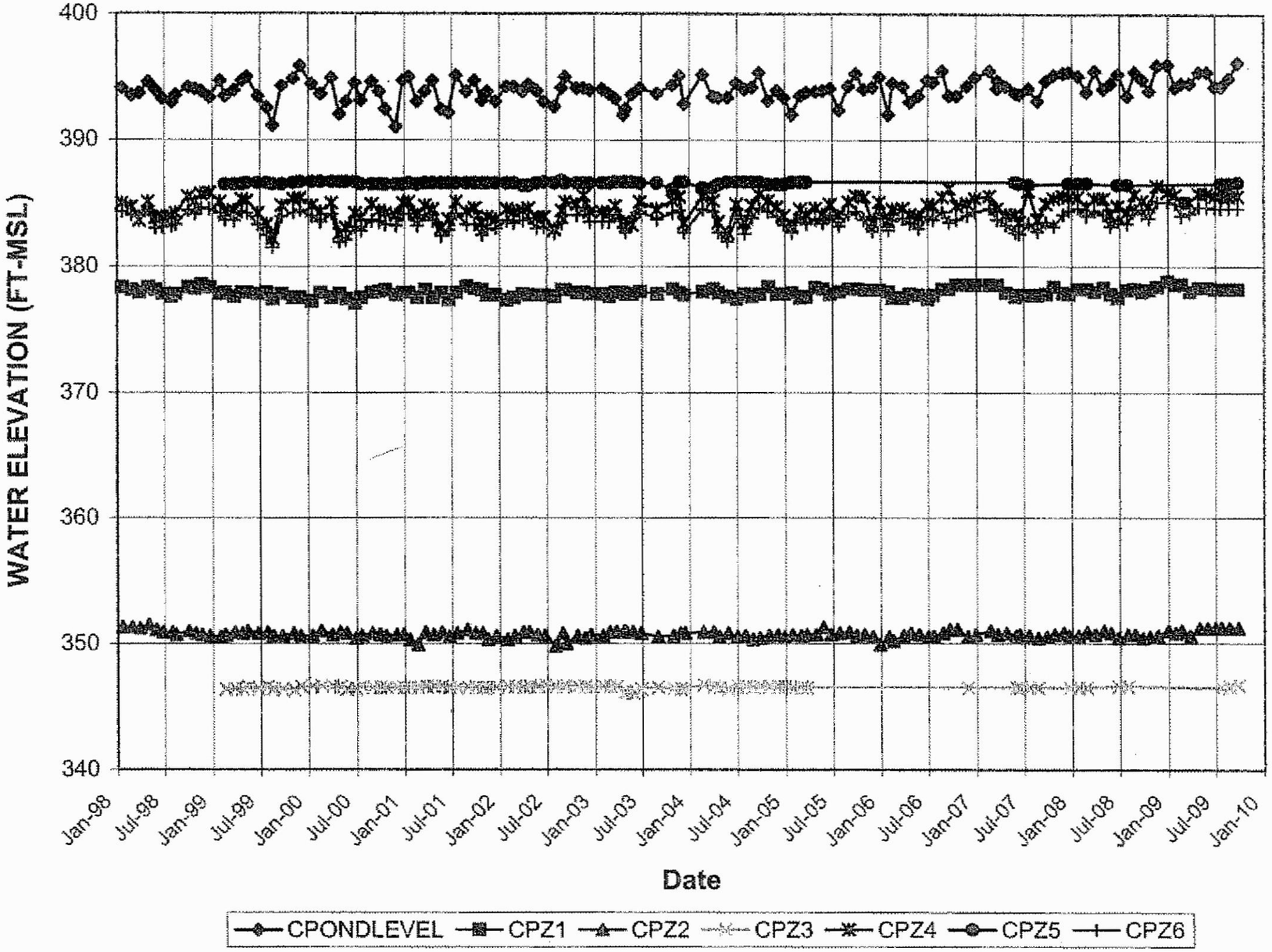
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 6A

CONFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond C Piezometers



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ASH POND C INSTRUMENTATION LOCATION PLAN

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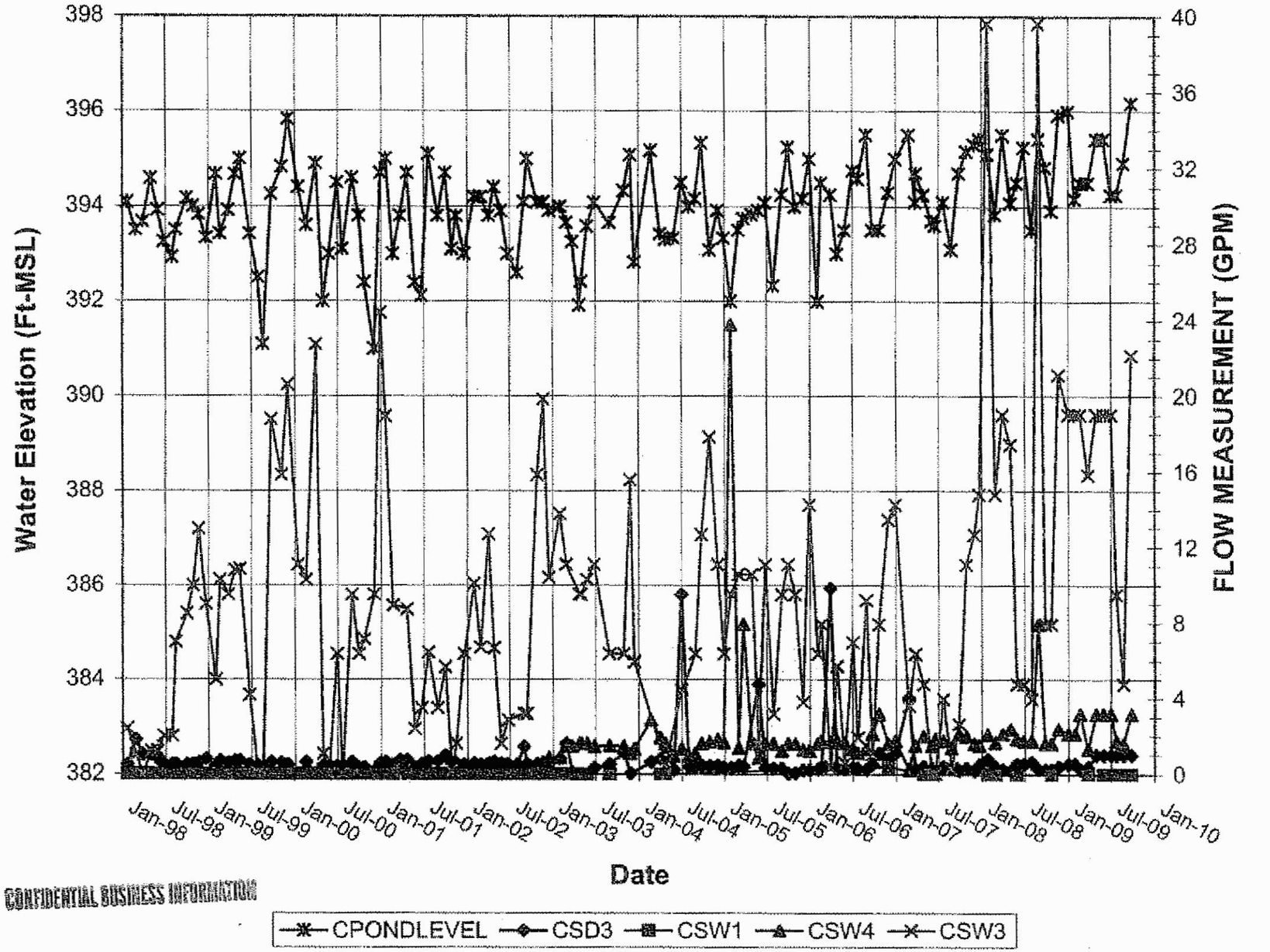
FIGURE 6B

Branch Ash Pond C Seepage Weirs and Drains



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ASH POND C SEEPAGE WEIR FLOW RATES

PLANT BRANCH
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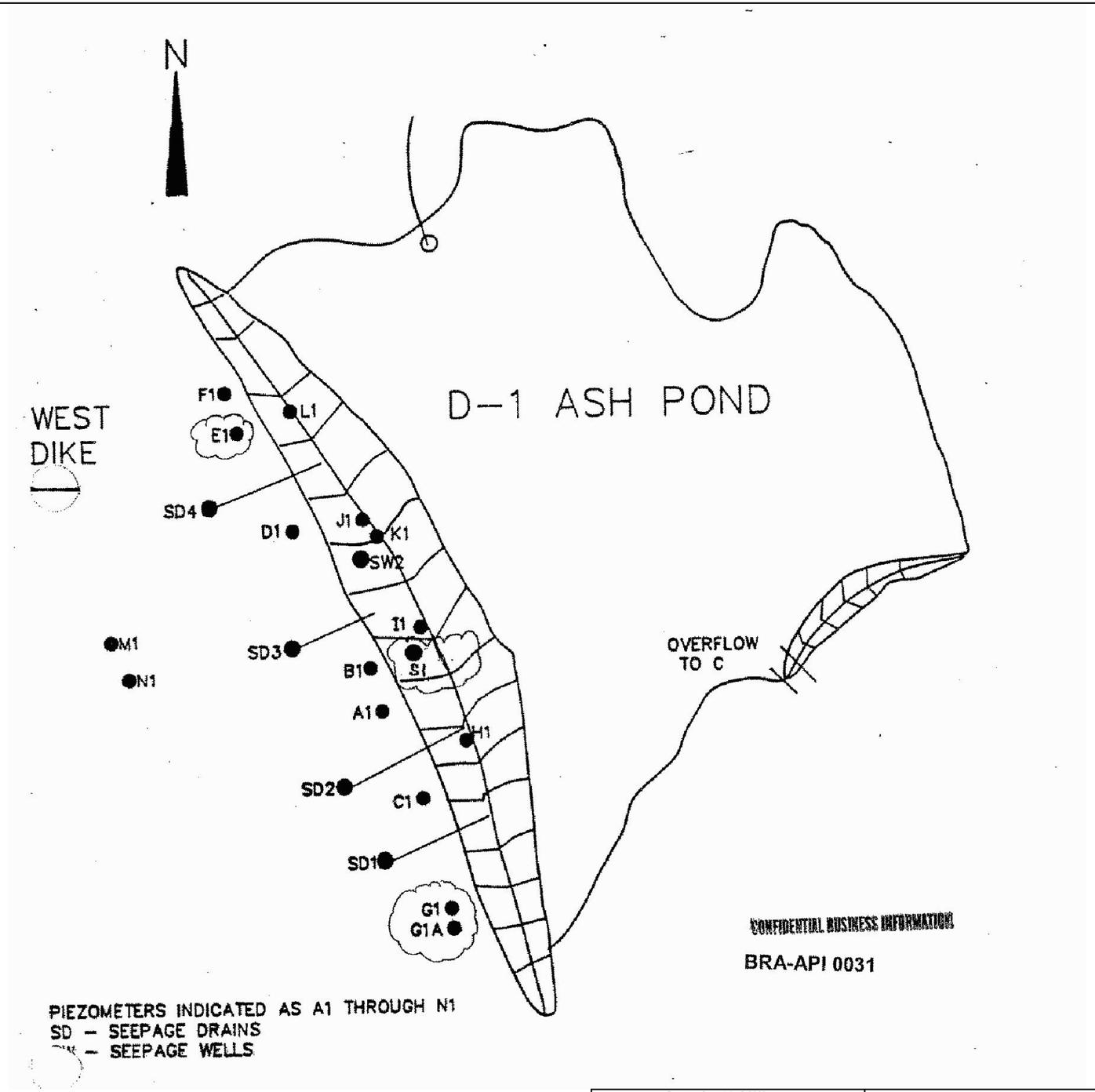
DATE: 12/2009

FIGURE 6C



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ASH POND D INSTRUMENTATION LOCATION PLAN

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

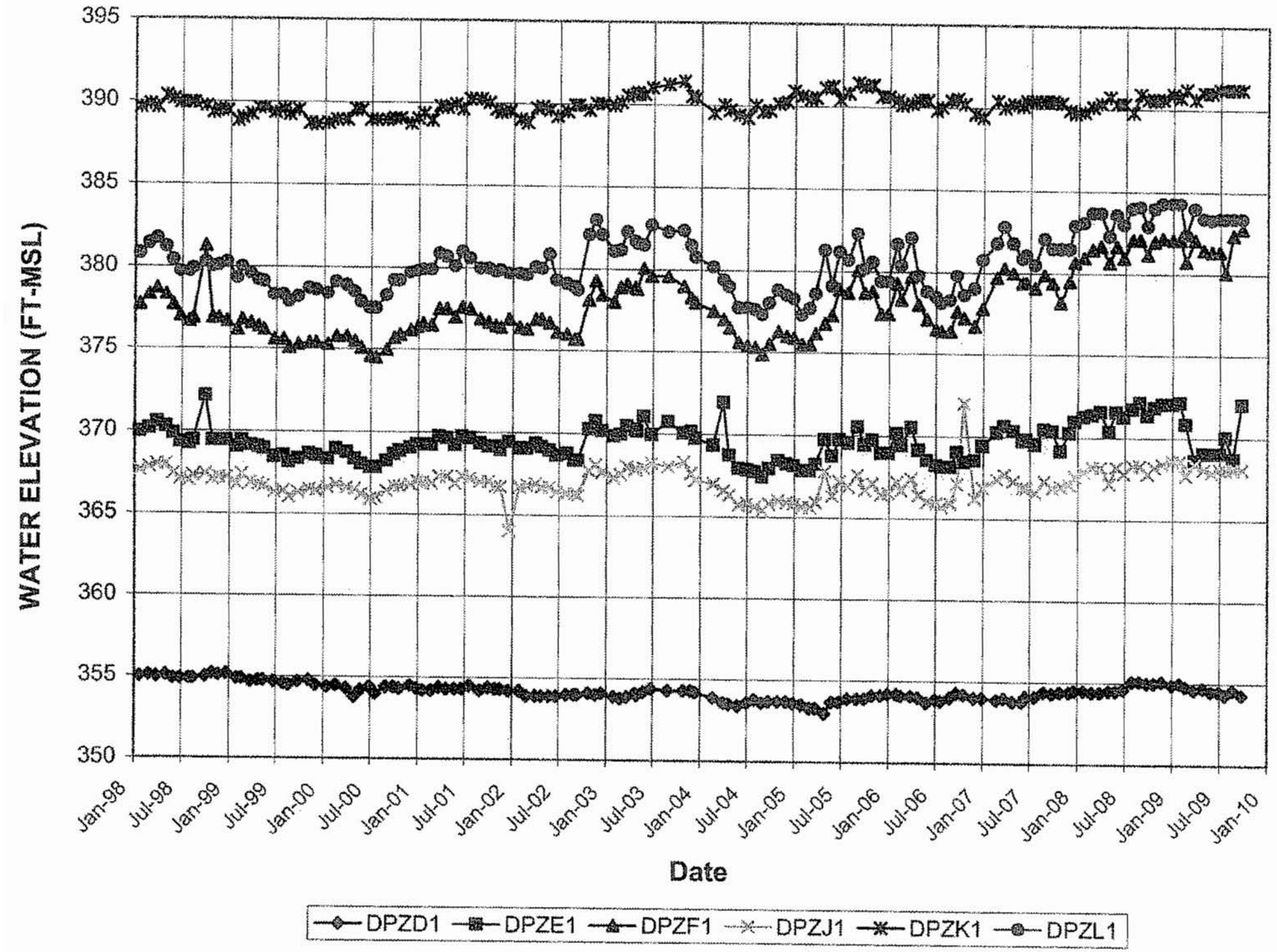
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 7A

NFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond D Piezometers - North End



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ASH POND D NORTH END PIEZOMETER LEVELS

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

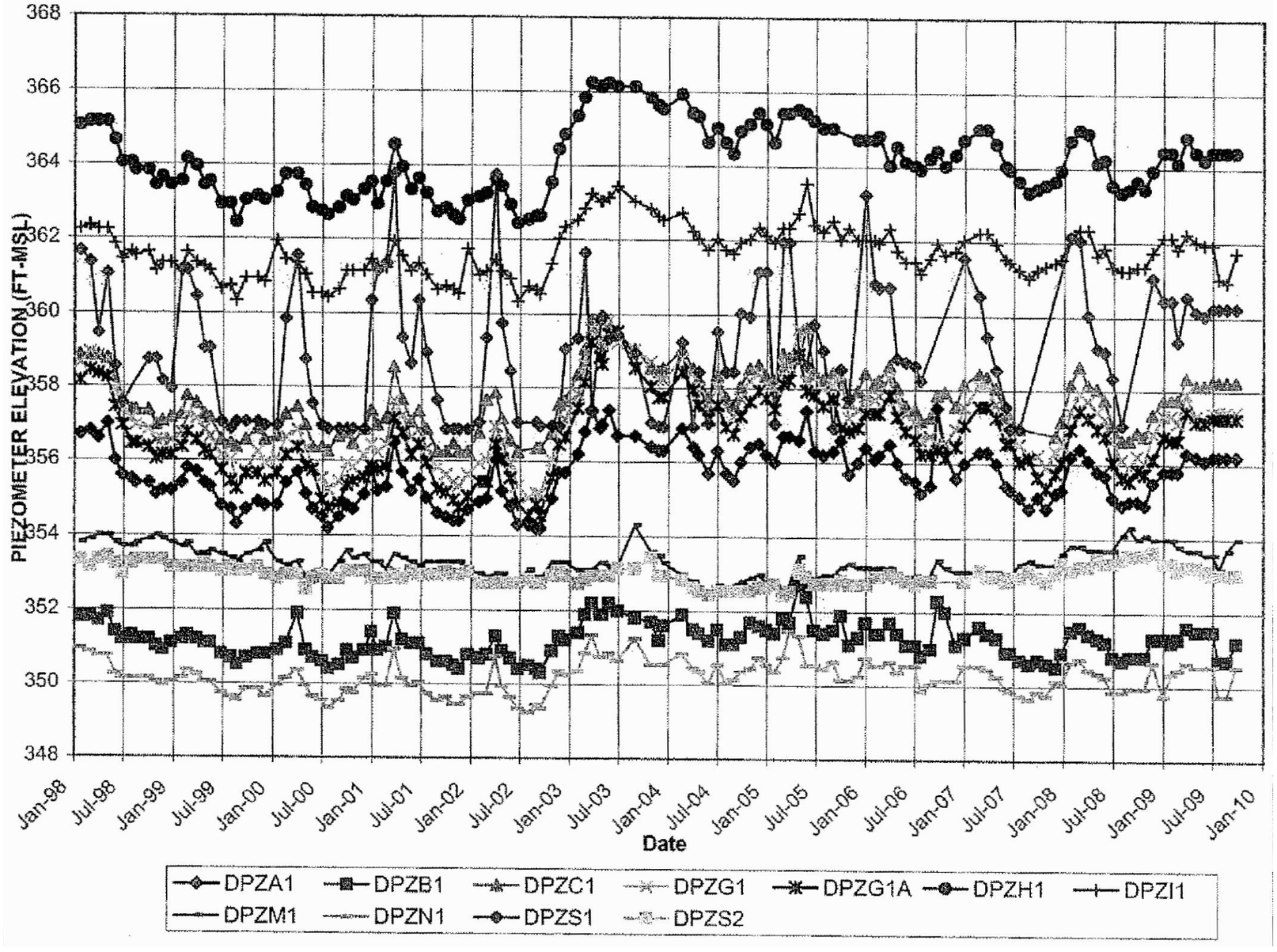
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 7B

CONFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond D Piezometers - South End



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ASH POND D SOUTH END PIEZOMETER LEVELS

PLANT BRANCH
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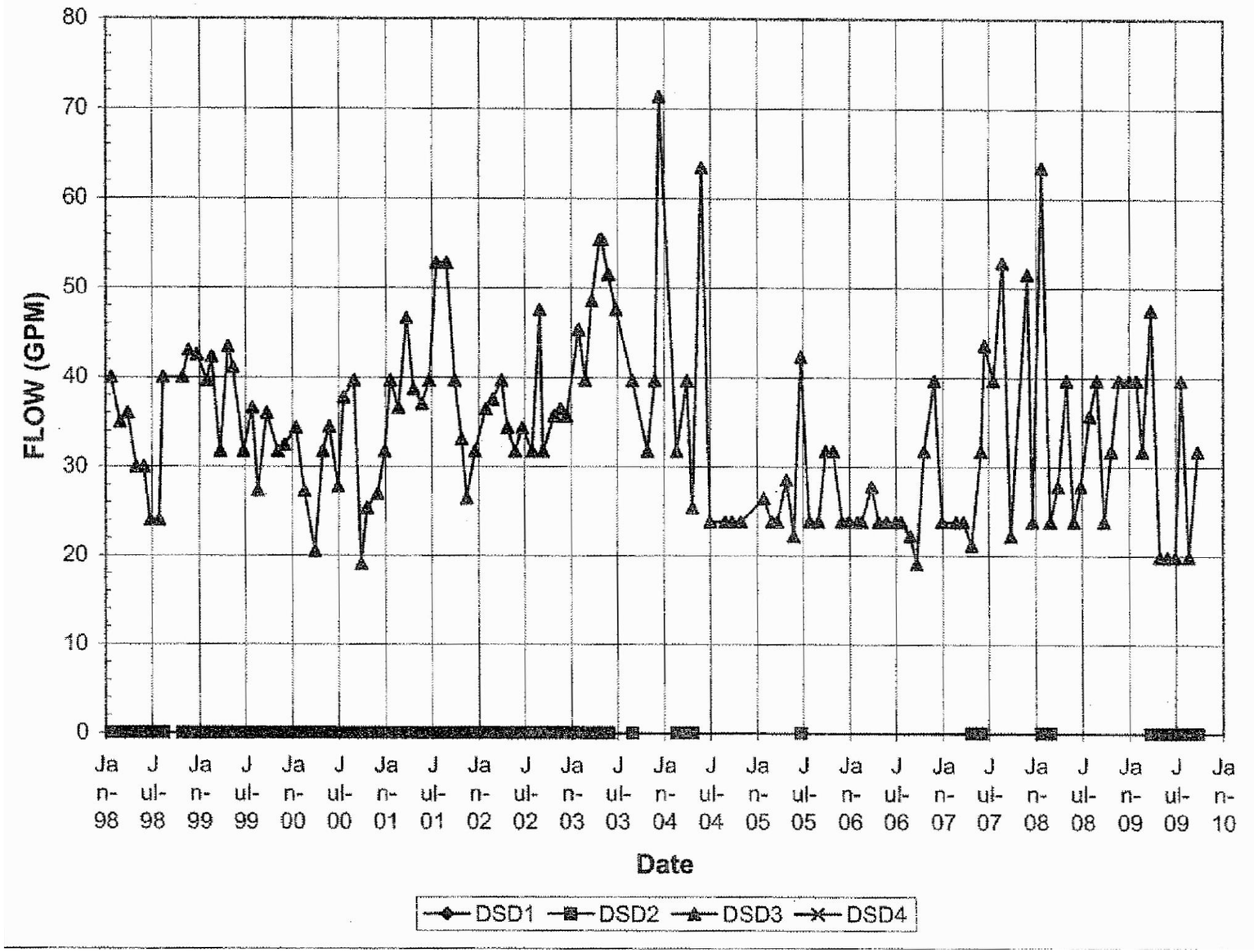
DATE: 12/2009

FIGURE 7C

CONFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond D Seepage Drains



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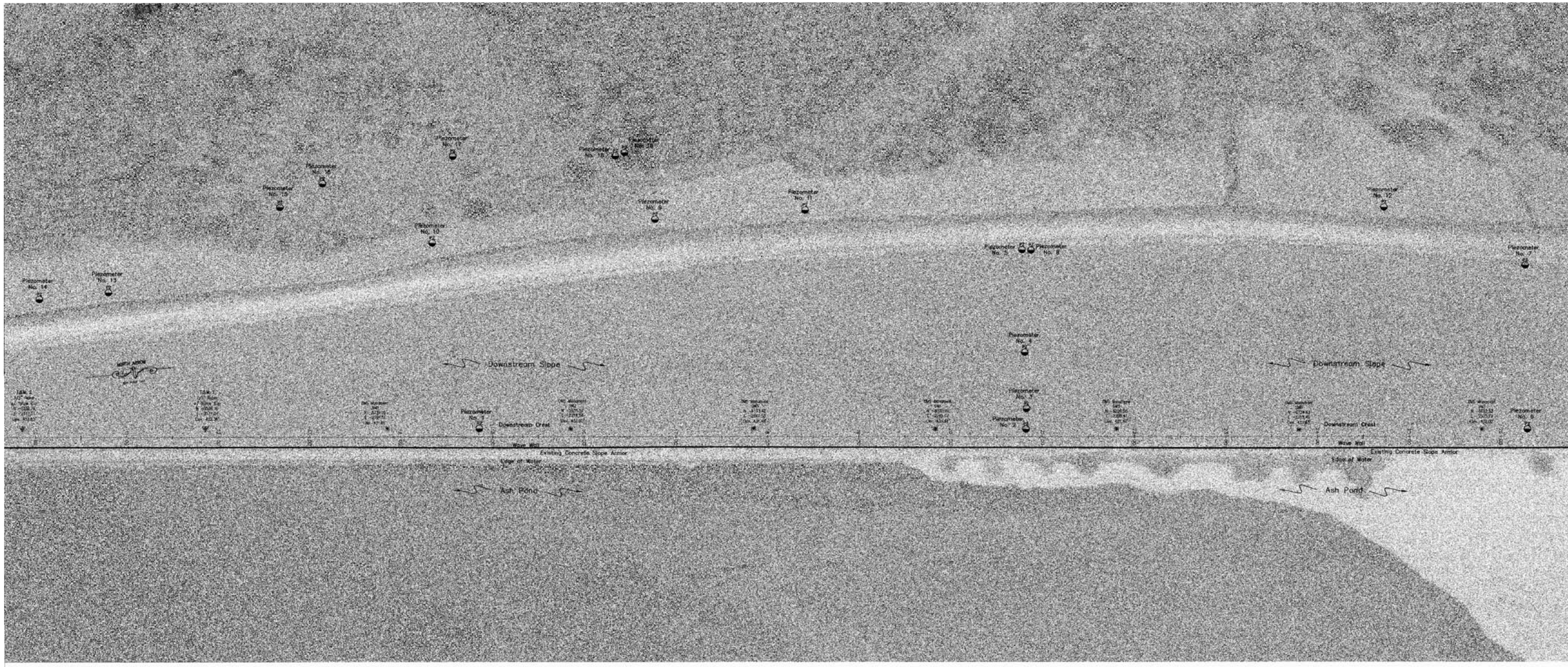
ASH POND D SEEPAGE WEIR FLOW RATES

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 7D



Piezometer	Easting	Northing	Top Pipe Elevation	Ground Elevation	Description
1	-2206.41	-5836.62	432.01	432.79	PVC Pipe
2	-2276.85	-6428.30	432.60	432.42	PVC Pipe
3	-2254.60	-6431.38	424.72	424.49	PVC Pipe
4	-2192.62	-6436.63	403.37	402.88	PVC Pipe
5	-2080.49	-6446.85	369.28	368.21	1" Steel Pipe
6	-2340.81	-6971.57	435.48	432.59	PVC Pipe
7	-2161.53	-6989.78	375.47	375.15	PVC Pipe
8	-2082.14	-6456.58	369.70	368.79	1" Steel Pipe
9	-2000.56	-6053.54	377.00	372.08	PVC Pipe
10	-1998.01	-5809.56	381.51	379.54	Metal Pipe
11	-2009.63	-6217.50	373.01	368.09	PVC Pipe
12	-2080.19	-6844.44	367.56	366.17	1" Steel Pipe
13	-2010.16	-5451.03	398.14	396.91	PVC Pipe
14	-2008.94	-5374.95	401.05	399.38	PVC Pipe
15	-1939.39	-5647.84	390.51	386.33	PVC Pipe
16	-1918.99	-5697.22	387.96	384.83	PVC Pipe
17	-1905.87	-5843.05	380.23	375.71	PVC Pipe
18	-1926.21	-6018.95	377.35	373.41	PVC Pipe
19	-1923.71	-6029.22	377.87	373.15	PVC Pipe

References:

1) Plant Harllee Branch Ash Pond E Property Plat. GPC Land Dept. map file no. M-3-20. Aug. 29, 1980.
2) Plant Harllee Branch Ash Pond E Topographic Map. GPC Land Dept. map file no. J-50-20. Feb. 1987.
3) Plant Harllee Branch Ash Pond E Dike PLan. SCS map file no. 10-501 E-78. Jan. 19, 1981.
4) Plant Harllee Branch Ash Pond E – Ash Pond Dike. GPC Land Dept. map file no. H-804-6. Sheets 1 & 2 of 2. June 2003.
5) Plant Harllee Branch Ash Pond E – Ash Pond Dike Wave Wall. GPC Land Dept. Map file no. H-942. March 30, 2005.

CONFIDENTIAL BUSINESS INFORMATION
BRA-API 0026

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ASH POND E PIEZOMETER & DEFORMATION MONITORING LOCATION PLAN

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

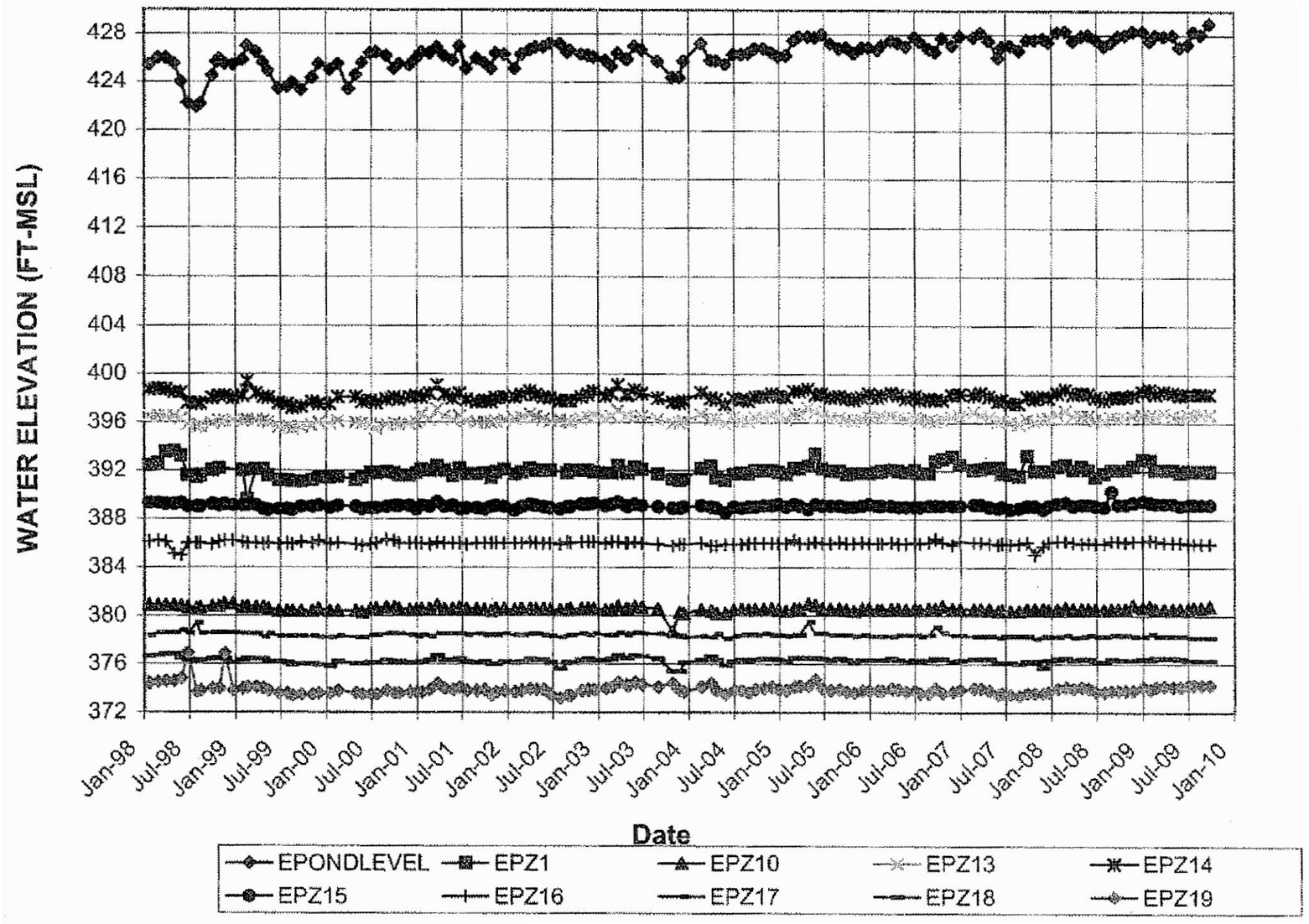
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 8A

CONFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond E Piezometers - North End



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ASH POND E NORTH END PIEZOMETER LEVELS

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

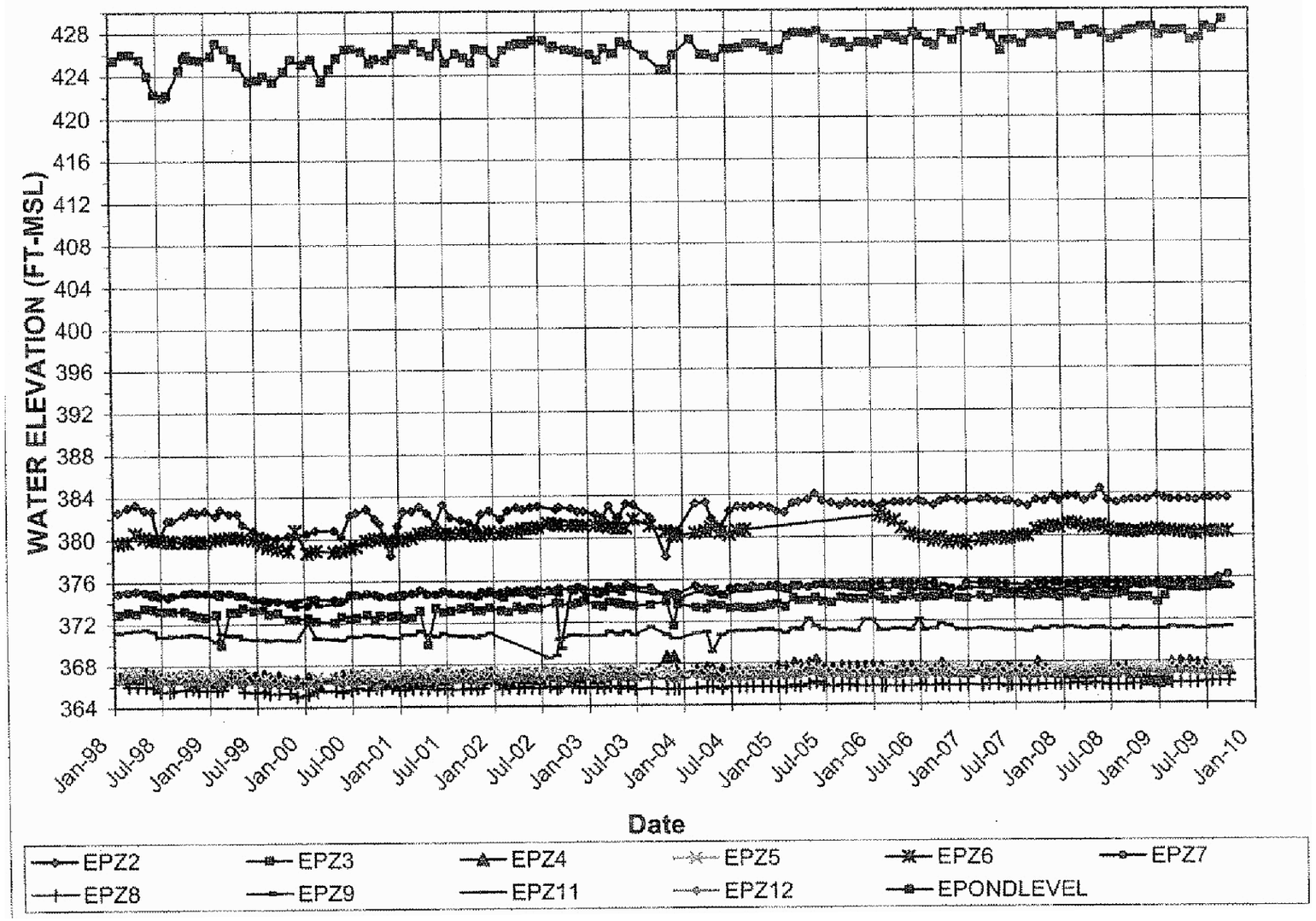
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 8B

CONFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond E Piezometers - South End



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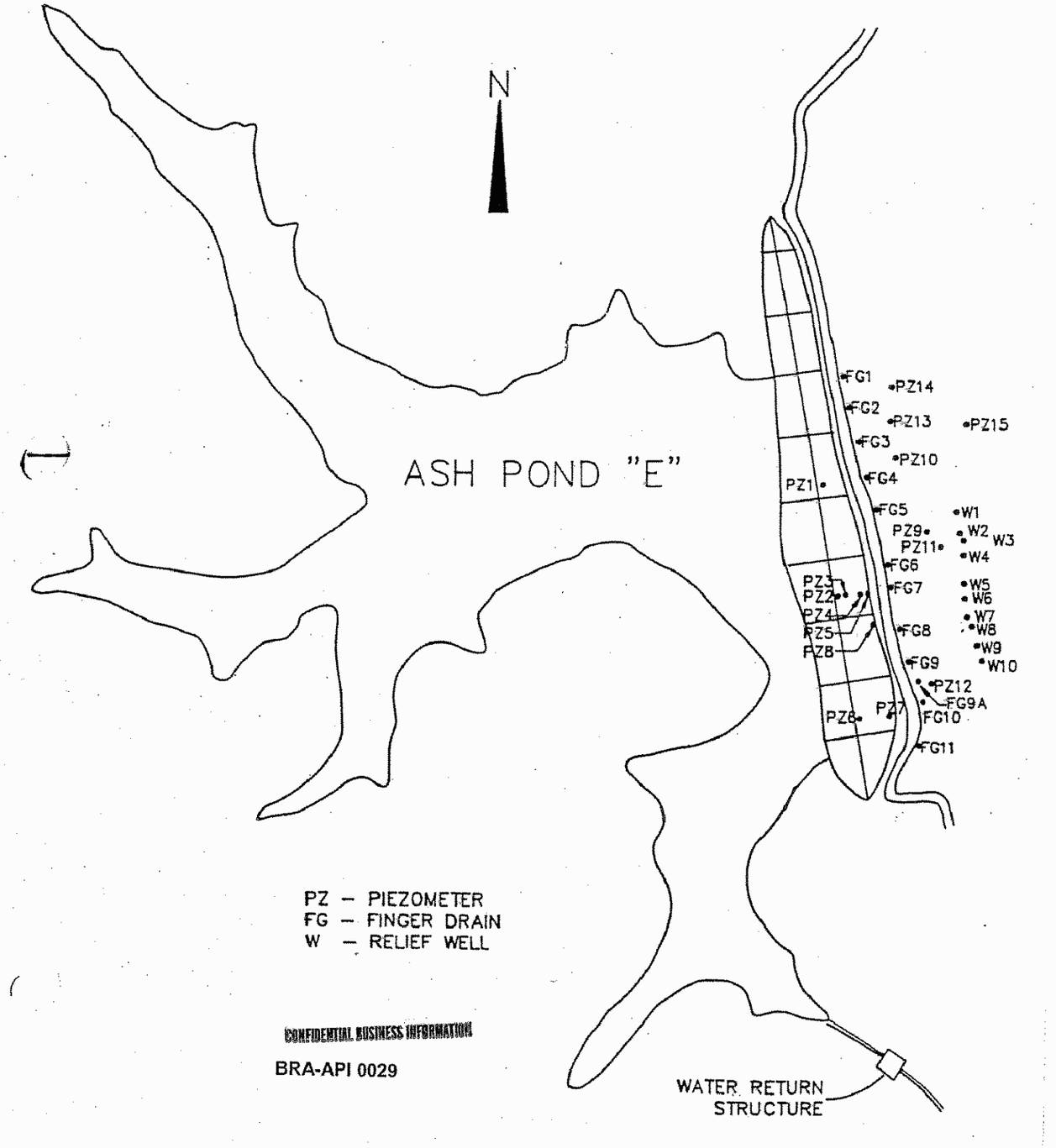
ASH POND E SOUTH END PIEZOMETER LEVELS

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 8C



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ASH POND E FINGER DRAIN AND RELIEF WELL LOCATION PLAN

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

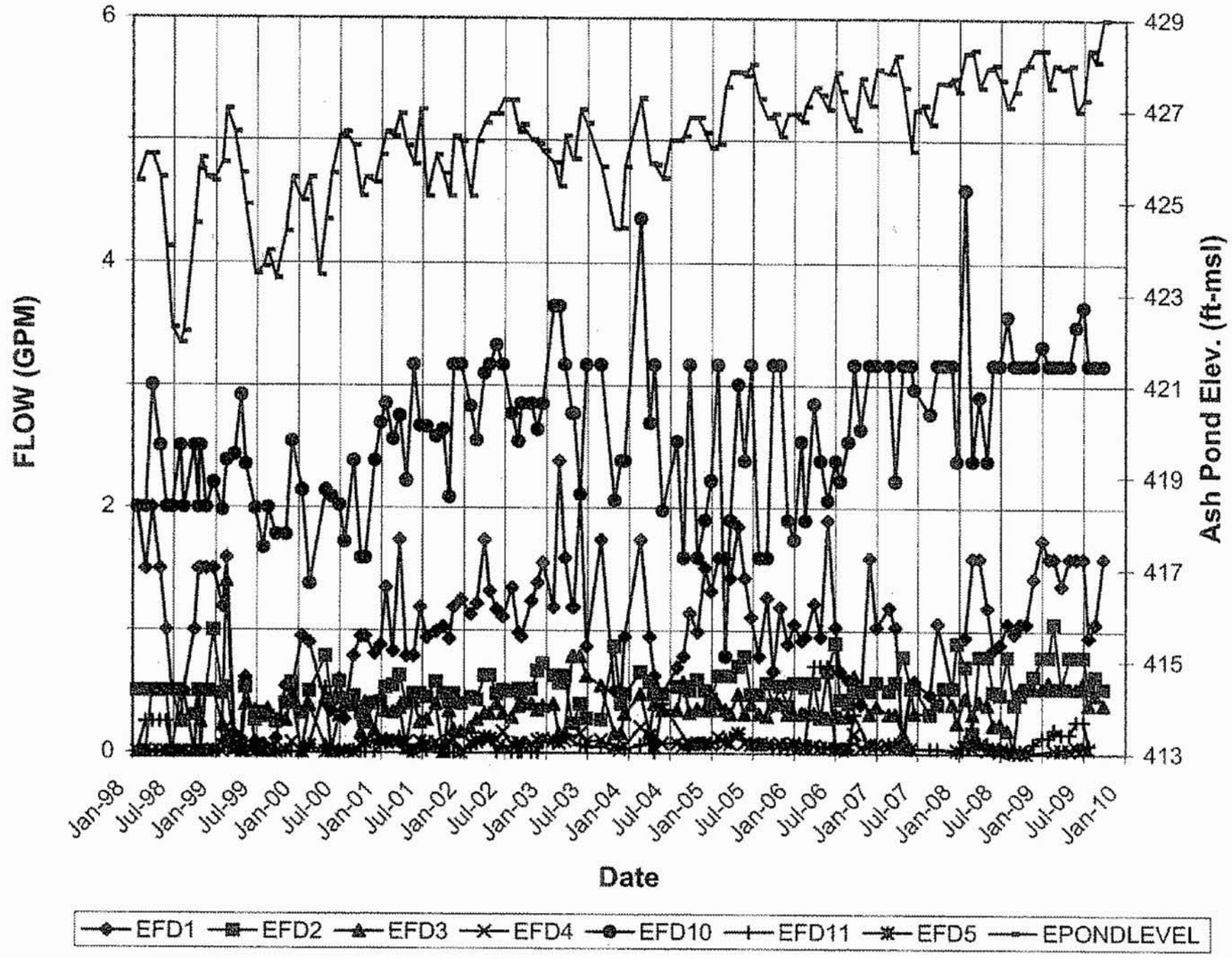
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 8D

CONFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond E Finger Drains



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ASH POND E FLOW RATE AT FINGER DRAINS SHEET 1 OF 2

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

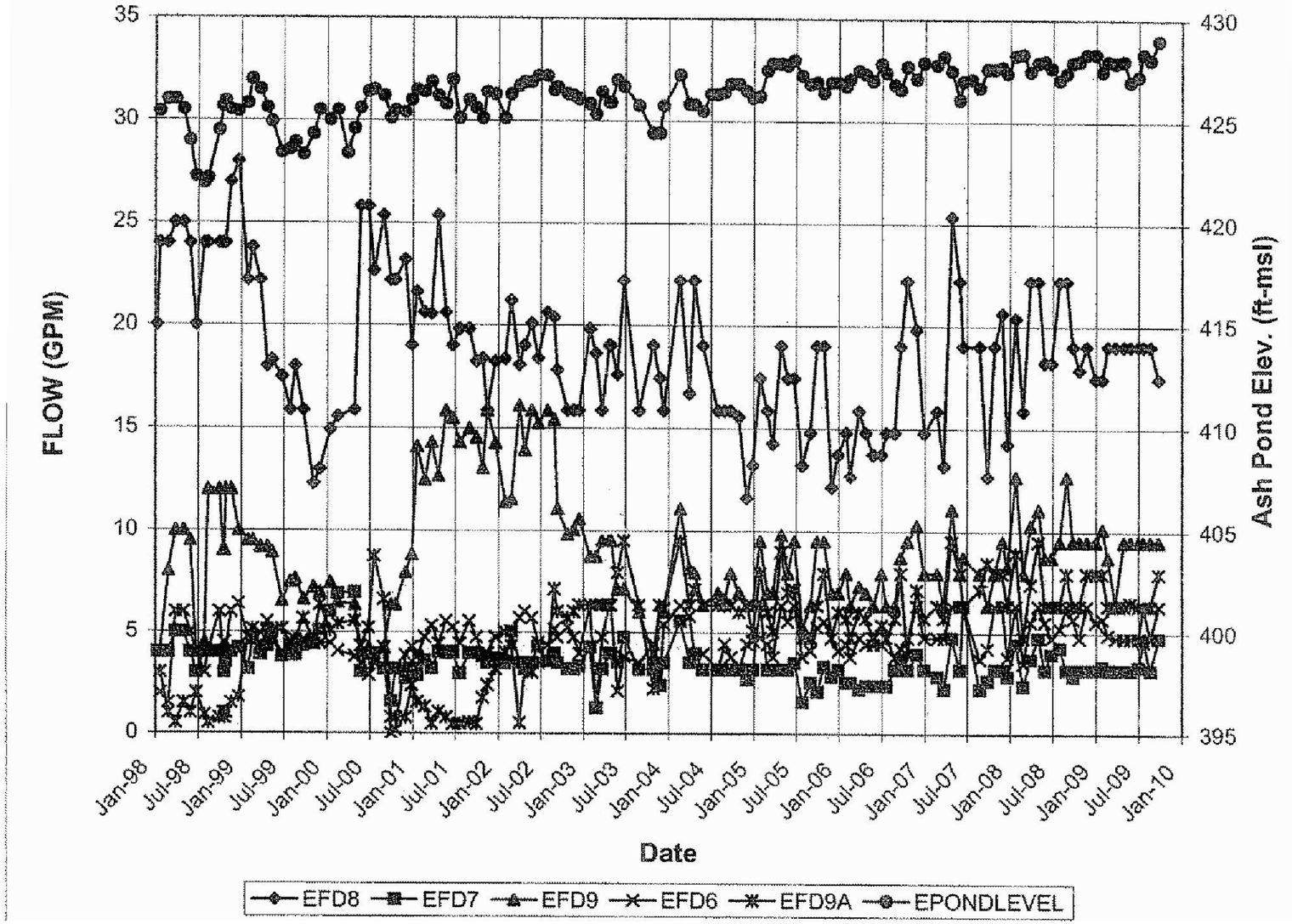
PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 8E

CONFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond E Finger Drain EFD8



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ASH POND E FLOW RATE AT FINGER DRAINS SHEET 2 OF 2

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

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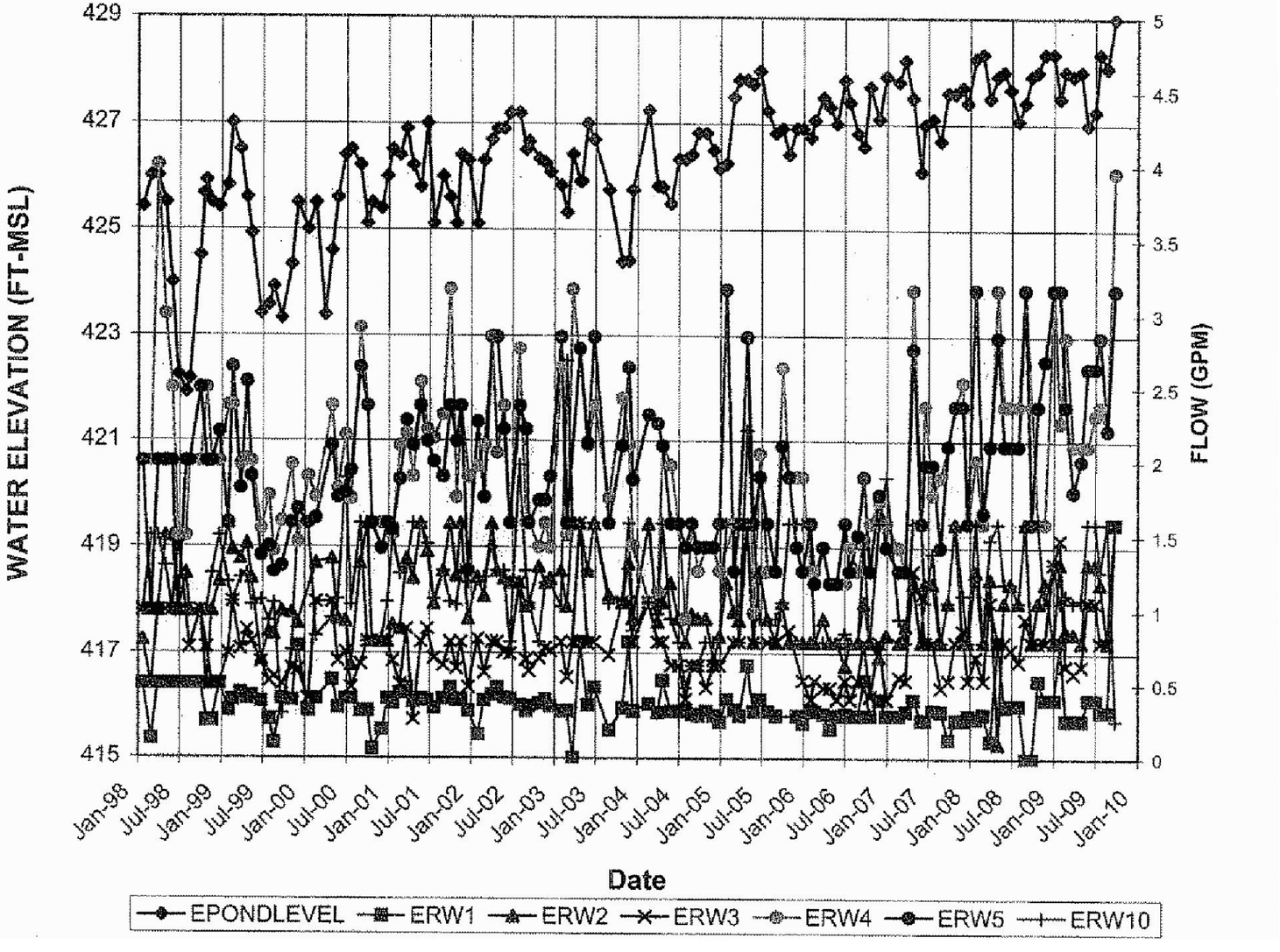
DATE: 12/2009

FIGURE 8F

CONFIDENTIAL BUSINESS INFORMATION

Branch Ash Pond E Relief Wells (1 of 2)



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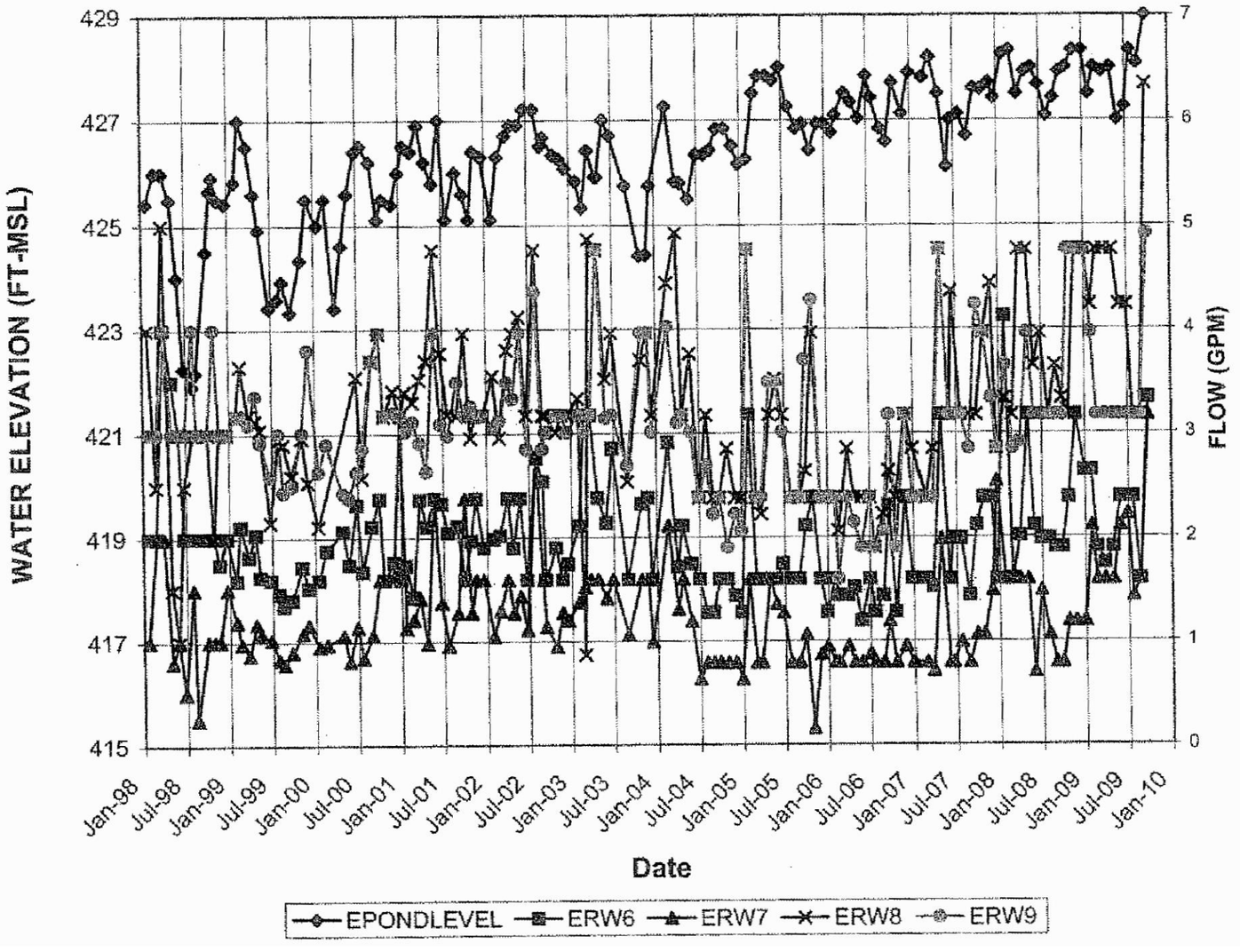
ASH POND E FLOW RATE RELIEF WELLS
SHEET 1 OF 2
PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060
DATE: 12/2009
FIGURE 8G

FIDENTIAL BUSINESS INFORMATION

Branch Ash Pond E Relief Wells (2 of 2)



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ASH POND E FLOW RATE RELIEF WELLS
SHEET 2 OF 2
PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 8H

3.0 DATA EVALUATION

3.1 Design Assumptions

Design drawings for the dikes at Ash Ponds indicate that the dikes were intended to impound liquid borne, completely saturated, coal combustion waste (CCW). The required free board on the dikes would have been based on hydraulic and hydrology analyses for the impoundment. This historical information was not available at the time this report was written and current operating procedures at the site include only a small area of liquid borne CCW within Ash Ponds B, C, and D. The remaining portions of Ash Ponds B, C, and D contain ash placed under hydraulic conditions.

3.2 Hydrology and Hydraulics

Georgia EPD classifies the dikes at Plant Branch as follows:

- Ash Ponds B and D: Category II structure based on their criteria that a failure at these impoundments would not be likely to result in a loss of life. As a Category II facility, Georgia regulations exempt the dams from the dam safety regulations.
- Ash Pond C: Not classified.
- Ash Pond E: Category I dam based on their criteria that a failure at this impoundment would likely result in a loss of life.

Georgia DNR EPD regulation 391-3-8-.09 (3.f) indicates that Category I dams shall be capable of safely passing the design storm based upon the fraction of the flood developed from the probable maximum precipitation (PMP) hydrograph depending on the sub-classification of the dam as provided in Table 3. Georgia defines the PMP as “the greatest amount of rainfall of a six-hour duration which would be expected for a given drainage basin as determined by Hydrometeoroligical Report No. 52 published the U. S. Weather Bureau.”

Table 2 – Georgia Design Storm

Dam Size	Size Definition	Design Flood
Small Dam	Storage capacity less than 500 acre-ft and a height less than 25 feet	25% of the PMP
Medium Dam	Storage capacity between 500 and 1000 acre ft or a height exceeding 25 feet	33.3%of the PMP
Large Dam	Storage capacity between 1000 and 50,000 acre-ft or a height between 35 and 100 ft	50% of the PMP
Very Large Dam	Storage capacity exceeding 50,000 acre ft or height exceeding 100 ft	100% of the PMP

Appropriate freeboard for wave action shall be considered by and engineer through engineering analysis. The required freeboard must be provided above the maximum reservoir elevation resulting from the inflow due to the design storm. Alternatively, a minimum freeboard of 3 feet shall be provided in earth dams.

As a Class 1 "very large" Dam, Georgia regulations require Ash Pond E to safely store or pass 100 percent of the PMP. CHA was not provided with a hydraulic analysis showing the ability of the Ash Pond E to safely store or pass the design storm.

3.3 Structural Adequacy & Stability

The Georgia Department of Natural Resources Environmental Protection Division outlines rules and regulations for dam safety in Standards for the Design and Evaluation of Dams (391-3-8-.09). The regulations state that all dams must be stable under all conditions of construction and/or operation of the impoundment. Analyses using the methods, guidelines and procedures of the agencies listed in the regulations yielding the minimum safety factors shown in Table 3 for earthen embankments can be considered as acceptable stability.

Table 3 - Minimum Safety Factors Required

Load Case	Required Minimum Factor of Safety
End of Construction	1.3
Steady State Seepage	1.5
Steady State Seepage with Seismic Loading	1.1
Rapid Drawdown (Upstream)	1.3
Submerged Toe with Rapid Drawdown	1.3

Georgia DNR EPD regulation 391-3-8-.09 (3.c) indicates that dams must be designed to withstand seismic accelerations defined in the most current United States Geologic Services (USGS) Map for Peak Accelerations with a 2% exceedance in 50 years and that the minimum seismic acceleration shall be 0.05g.

CHA reviewed the available design documents related to slope stability for Ash Ponds C, D, and E.

3.3.1 Ash Pond B Stability Analysis

The Ash Pond B dike was constructed of dumped rock. As discussed above, shortly after initial sluicing to the pond, seepage was observed at five locations on the downstream slope. A significant portion of the dike was grouted to mitigate the seepage. Slope stability analysis for the design or grouted condition was not provided for Ash Pond B. CHA recommends that these analyses be performed. The documents also indicate that sloughing of the clay cap was observed due to the steep slope; therefore, it is recommend that instrumentation be installed to asses the risk of piping through the embankment.

3.3.1 Ash Pond C Stability Analysis

Southern Power Company Drawing H-89-A indicated that southern dike was constructed in two phases and the upstream slope was constructed above existing fill. Southern Power Company Drawing H-93 is assumed to present slope stability information for Ash Pond C based the configuration of the dike cross section.

The following table summarizes the soil parameters used in the analysis. Information regarding the selection of the soil parameter values was not provided. Two of the soil strength values were unclear on the copy provided as indicated below.

Table 4 – Ash Pond C Soil Strength Parameters

Soil Stratum	Unit Weight (pcf)	Friction Angle (φ in degrees)	Cohesion (psf)	Description
A	109	0	1,310	Natural soil below west end of south dike
B	126	28.5	420	Natural soil below center of south dike and east dike
C	128	Unclear	940	Embankment fill
E	120	30.0	Unclear	Existing fill

Stability analysis was performed for three cross sections: Section A through the west end of the south dike, Section B through the center of the south dike, and Section C through the south end of the east dike. A note on the drawing indicated that the analysis was performed on a computer using a "hunt" analysis program. Figures 9A and 9B show analysis cross section and minimum factor of safety circles and the computed factor of safety is summarized in the following table for each section.

Table 5 - Ash Pond C Safety Factors

Load Case	Required Minimum Factor of Safety	Computed Factor of Safety		
		A	B	C
End of Construction	1.3	NP	NP	1.36
Steady State Seepage	1.5	3.07	2.79	1.96
Steady State Seepage with Seismic Loading	1.1	NP	NP	NP
Rapid Drawdown (Upstream)	1.3	NP	NP	1.38

NP: Not performed

3.3.2 Ash Pond D Stability Analysis

A copy of a design drawing presenting the results of a slope stability analysis. The location of the cross section is not indicated. The following Tables 6 and 7 summarize the soil parameters used in the analysis for the end-of-construction and steady state/seismic conditions of the southwest dike at Ash Pond D. Information regarding the selection of the soil parameter values was not provided. The cross section in Figure 5D indicates that the "most impervious material" was to be placed in the center of the dam and less pervious material was to be placed up and downstream of this core. However, information on nature of the material and method of placement and compaction was not described and construction documentation has not been provided. The soil strata in the slope stability analysis does not differentiate between different embankment fill materials.

Table 6 – Ash Pond D Soil Strength Parameters – End of Construction

Soil Stratum	Unit Weight (pcf)	Friction Angle (φ in degrees)	Cohesion (psf)	Description
1	120	16	1,000	Moist upstream fill
2	125	16	1,000	Saturated upstream fill
3	118	15	1,000	Saturated embankment fill
4	130	25	0	Blanket drain sand
5	120	16	1,000	Moist downstream fill
6	125	16	1,000	Saturated downstream fill
7	127	15	1,000	Natural Alluvium
8	120	18	0	Embankment Fill

Table 7 – Ash Pond D Soil Strength Parameters – Steady State and Seismic

Soil Stratum	Unit Weight (pcf)	Friction Angle (φ in degrees)	Cohesion (psf)	Description
1	125	30	0	Saturated upstream fill
2	127	32	0	Saturated dike fill
3	118	32	0	Moist dike fill
4	135	25	0	Blanket drain sand
5	120	30	0	Moist downstream fill
6	125	30	0	Saturated downstream fill
7	125	33	0	Natural alluvium

Figure 9C shows the analysis cross section and minimum factor of safety circles for each loading condition. The computed factor of safety is summarized in the following table.

Table 8 - Ash Pond D Safety Factors

Load Case	Required Minimum Factor of Safety	Computed Factor of Safety
End of Construction	1.3	1.4
Steady State Seepage	1.5	1.7
Steady State Seepage with Seismic Loading	1.1	1.1
Rapid Drawdown (Upstream)	1.3	NP

NP: Not performed

3.3.3 Ash Pond E Stability Analysis

The following tables summarize the soil parameters used in the analysis for the end-of-construction and steady state/seismic conditions. Q-test results were used for the construction condition, effective strength parameters from laboratory testing were used for the steady state condition, and total stress parameters were used for the rapid drawdown conditions. Information on the magnitude of the earthquake force is not provided.

Table 9 – Ash Pond E Soil Strength Parameters – Construction

Soil Stratum	Unit Weight (pcf)	Friction Angle (φ in degrees)	Cohesion (psf)	Description
1	109	8	1,800	Compacted fill – upstream zone
2	95	19	2,100	Compacted fill – center zone
3	83	22	1,400	Compacted Fill – downstream zone
4	92	15	900	Natural clayey sandy silts
5	100	28	0	Natural partially weathered rock
6	100	20	0	Blanket drain sand

Table 10 – Ash Pond E Soil Strength Parameters – Steady State

Soil Stratum	Unit Weight (pcf)	Friction Angle (φ in degrees)	Cohesion (psf)	Description
1	109	36	0	Compacted fill – upstream zone
2	95	30	400	Compacted fill – center zone
3	88	24	800	Compacted Fill – downstream zone
4	92	27	200	Natural clayey sandy silts
5	100	35	0	Natural partially weathered rock
6	100	28	0	Blanket drain sand

Table 11 – Ash Pond E Soil Strength Parameters – Rapid Drawdown

Soil Stratum	Unit Weight (pcf)	Friction Angle (φ in degrees)	Cohesion (psf)	Description
1	109	14	800	Compacted fill – upstream zone
2	95	13	1000	Compacted fill – center zone
3	85	8	1700	Compacted Fill – downstream zone
4	92	14	800	Natural clayey sandy silts
5	100	0	30	Natural partially weathered rock
6	100	22	0	Blanket drain sand

Slope stability analyses were performed in 1980 at two locations: Sta. 25+00 and Sta. 20+00 which is identified as the maximum section without cut-off. The factors of safety are the minimum values obtained using both the simplified Bishop and Fellenius methods. Figures 9D and 9E presents the results of the slope stability analysis and the computed factors of safety are summarized in the following table.

Table 12 - Ash Pond D Safety Factors

Load Case	Required Minimum Factor of Safety	Computed Factor of Safety	
		Sta. 20+00	Sta 25+00
End of Construction	1.3	1.75	1.82
Steady State Seepage	1.5	1.80	1.66
Steady State Seepage with Seismic Loading	1.1	1.20	1.10
Rapid Drawdown (Upstream)	1.3	1.29	1.50

NP: Not performed

3.3.4 Instrumentation Date Related to Stability Analysis

At Ash Pond C, arrays consisting of three piezometers have been in installed across the approximate center of the south dike and approximate center of the west dike as shown on Figure 6A. The phreatic surface indicated by the array in the south dike is relatively consistent with the design surface shown for the stability cross section in Figure 9A. Instrumentation data is not available for comparison with the design phreatic surfaces at Sections A and B which are located on the west end of the south dike and at the south end of the east dike.

Sixteen open-stand-pipe piezometers have been installed along the Ash Pond D southwest dike. In general, they indicate a decrease in the water level across the dike. However, insufficient survey data was provided to compare the measured water level to the design phreatic surface shown on the slope stability cross section. Additionally, the location of the cross section along the dike is not indicated on the design drawings.

Fifteen open-stand-pipe piezometers have been installed to monitor the water level within and downstream of the Ash Pond E west dike. Piezometers EPZ2 through EPZ5 and EPZ8 were installed across the dike at approximately Sta. 20+75. A review of this data indicates that the phreatic surface decreases through the downstream slope of the dike from about El. 384 near the crest to about El. 366 near the toe. This information appears generally consistent with the design phreatic surface.

3.4 Foundation Conditions

Design and construction information has not been provided for Ash Pond B.

Construction drawings for Ash Pond C indicate that fill for the downstream side of the south dike was placed above “existing fill” adjacent to Lake Sinclair. Information on the nature of the

existing fill is not provided. The construction drawings also indicate removal of at least 12 inches of material or removal of "all unsuitable foundation material" within the footprint of the three dikes prior to fill placement.

A boring location plan was provided for Ash Pond D showing the location of 21 borings within the footprint of the dike and 17 borings within the pond area. A subsurface profile or boring logs were not provided. Construction drawings for Ash Pond D indicate that the natural alluvium was to be removed to approximately El. 338 between Sta. 10+20 and Sta. 11+90 which corresponds to the low area of the valley.

Subsurface profile information below the Ash Pond E dike indicates that subsurface conditions generally consisted of sandy silty clay overlying sand overlying partially weathered rock. The sandy silty clay was soft within the low point in the valley. Construction drawings for Ash Pond E indicate that soft foundation material is to be removed between Sta. 20+20 to Sta. 30+10 which corresponds to the natural low point in the valley prior to construction. The drawing also indicates construction of a cut-off trench extending to "hard rock" at the south abutment.

It is understood that that Ash Ponds A, B, C, D and E were designed by a Professional Engineer. It is further understood that Ash Ponds B, C, D, and E were constructed under the supervision of a Professional Engineer and are currently inspected by a Professional Geologist who is reviewed by a Professional Engineer. At this time, no supporting documentation is available regarding the construction of Ash Pond A under the supervision of a Professional Engineer and it is not currently inspected due to pond closure.

3.5 Operations & Maintenance

CHA has not been provided with a copy of an Operation, Maintenance, and Inspection (OM&I) Manual or Emergency Action Plan (EAO) for Plant Branch. Based upon conversations during our site visit, we understand that Plant personnel visually inspect the dikes daily and weekly and

monthly and quarterly reports are generated from water quality, piezometric levels, volumetric flows, and engineering inspections where applicable.

3.5.1 Inspections by Georgia Department of Natural Resources

Southern Power provided copies of the Georgia Department of Natural Resources annual inspection reports for the period between 1992 and 2008. Ash Ponds B, C, and D are classified as "Category II" dams by the Georgia DNR; therefore these dikes are not inspected by the state. The following recommendations regarding Ash Pond E were contained in the 2008 report:

- Clean out sediment that has collected in the concrete drainage channels.
- Continue to mark and monitor the wet areas at the toe.
- Vegetation on the fabiform upstream slope protection should be periodically removed.
- Standing water was observed on the upstream side of the wave wall. Drainage should be provided through the wall to reduce the potential for water seepage through the crest.
- Additional grass is needed on the downstream slope near the crest.

3.5.2 Inspections by Southern Company

Quarterly inspection of the dikes at Ash Ponds B, C, D, and E are part of "a comprehensive dam safety program run by Southern Power Generation Hydro Services." (letter to EPA March 25, 2009) CHA was provided with copies of quarterly inspection reports for the period between the first quarter of 2006 and forth quarter of 2009. Reports for each quarter within the period were not provided; it is unclear if inspections were not performed at these times or if the reports were not provided.

The report for the 2nd quarter of 2009 describes sloughs that occurred on the Ash Pond C dike on March 30, 2009 and April 5, 2009 similar to previous surface sloughs that have occurred since construction in 1970. It was concluded that the sloughs were surface features that did not present

an immediate danger to the stability of the dike. After the disturbed soil was removed, a filter fabric was placed on the exposed surface and the void was filled with about 6 inches of gravel and 1 to 2 feet of larger surge stone or rip rap.

The report for the 2nd quarter of 2009 also recommended removal of excess material (i.e. rocks, debris, etc.) near the top of the downstream slope at Ash Pond B. The purpose of the recommendation was to reduce the occasionally over-steepened upper portion of the downstream dike slope and to restore these areas as much as possible to the original slope. The 3rd quarter report for 2009 indicated that this work had been completed.

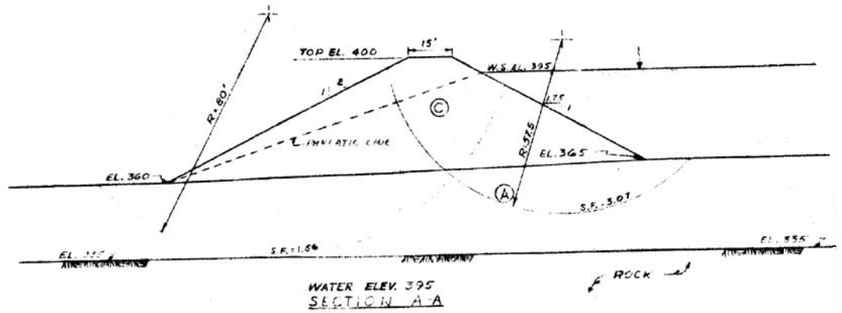
The following recommendations were made in the inspection report for the forth quarter of 2009 following their site visit on October 27, 2009:

- At Ash Pond C, "wash-outs from heavy rains have occurred around several drains on the upstream crest and slope. These should be repaired."
- At Ash Pond D, soil and debris that has washed into the low point of the concrete ditch adjacent to seepage drain DSD3 should be cleared.
- Continue monitoring of small seepage areas adjacent to RW-1 as a precaution.

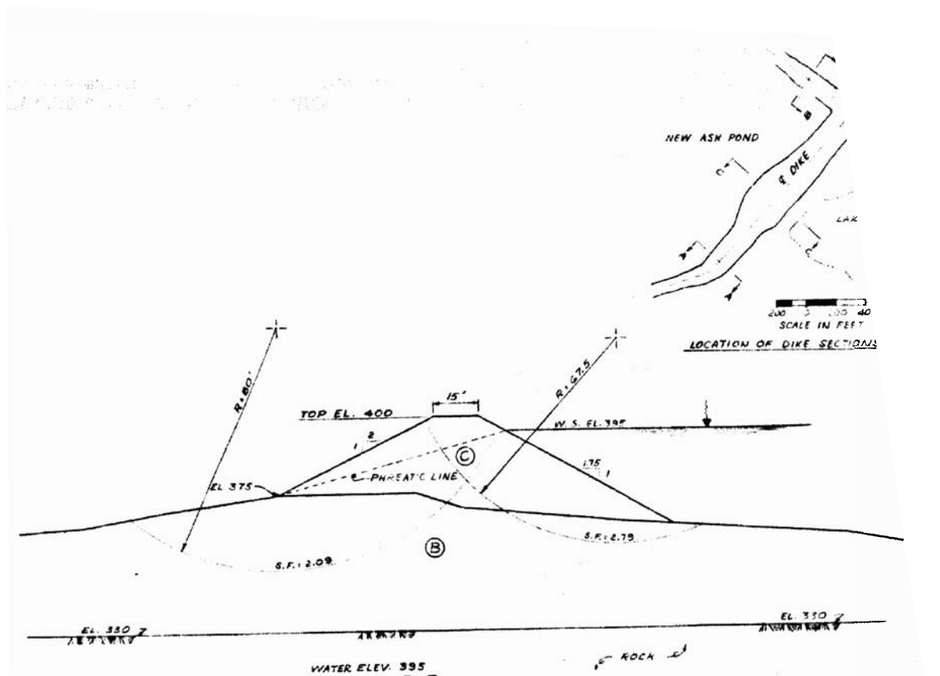
In the inspection report for the 4th quarter of 2009, Southern Company indicated that the "measurements have continued to track within historical limits and indicating acceptable performance of the embankments and various surveillance systems. All piezometers are read by plant personnel at least weekly.

3.5.3 Inspections by Engineering Consultants

Southern Company did not provide inspection reports prepared by engineering consultants.



WATER ELEV. 395
SECTION A-A



WATER ELEV. 395
SECTION B-B

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Main: (518) 453-4500 · www.chacompanies.com

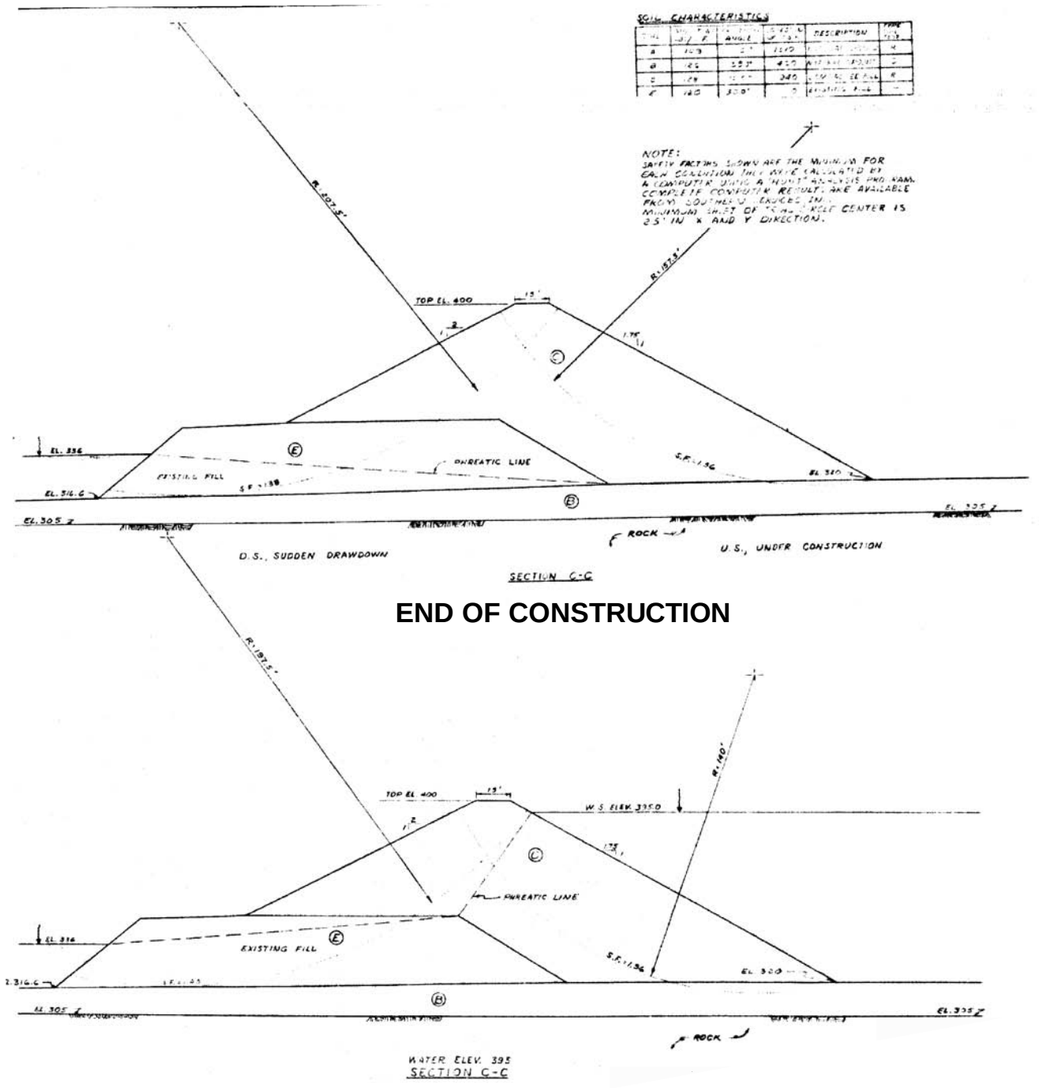
ASH POND C STABILITY ANALYSIS – SECTION A AND B

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 9A



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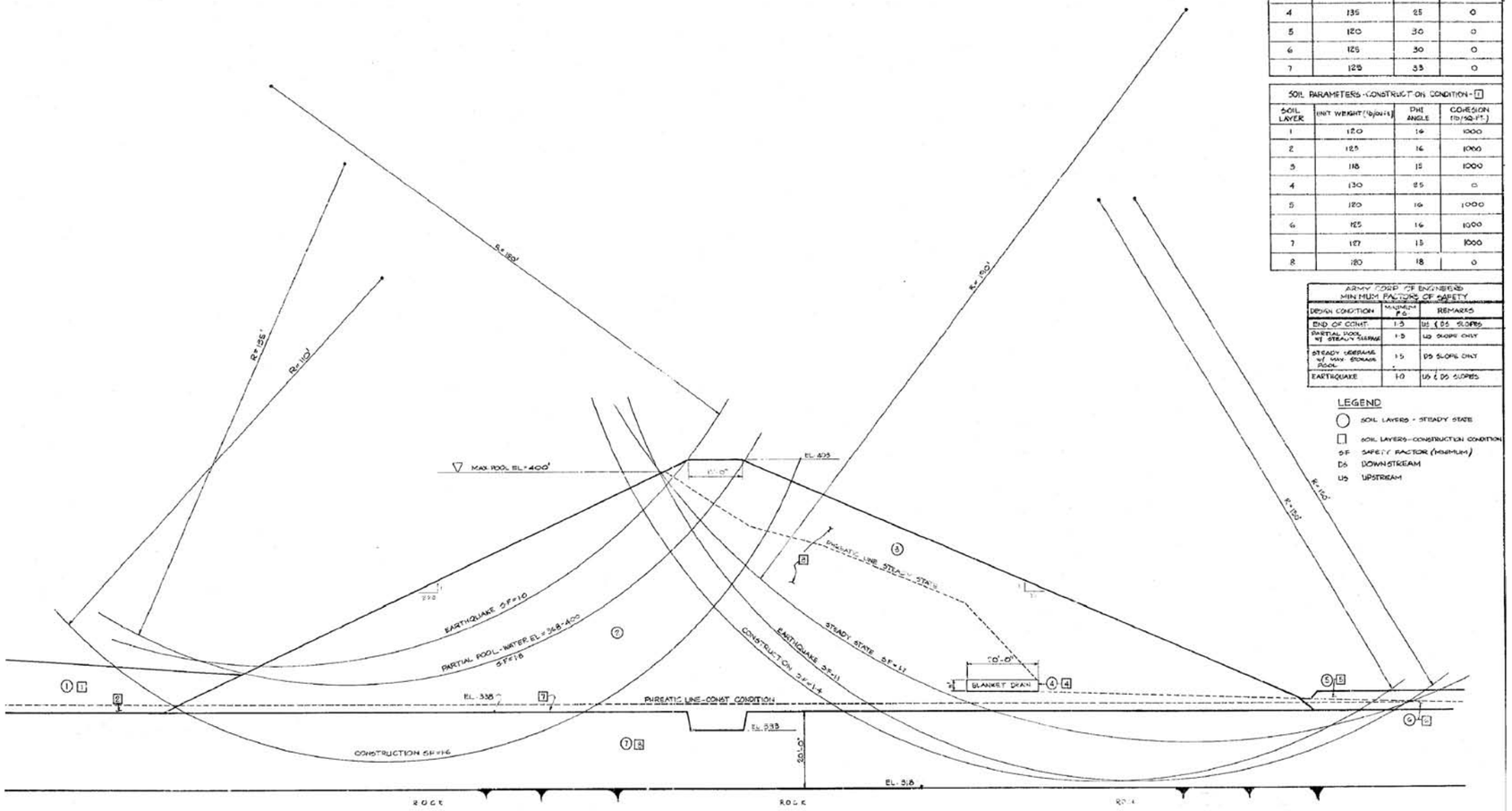
ASH POND C STABILITY ANALYSIS – SECTION C

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 9B



SOIL PARAMETERS - STEADY STATE AND EARTHQUAKE CONDITION (1)			
SOIL LAYER	UNIT WEIGHT (lb/cu ft)	PHI ANGLE	COHESION (lb/sq ft)
1	125	30	0
2	127	38	0
3	118	32	0
4	135	25	0
5	120	30	0
6	125	30	0
7	129	33	0

SOIL PARAMETERS - CONSTRUCTION CONDITION - (1)			
SOIL LAYER	UNIT WEIGHT (lb/cu ft)	PHI ANGLE	COHESION (lb/sq ft)
1	120	16	1000
2	125	16	1000
3	118	13	1000
4	130	25	0
5	120	16	1000
6	125	16	1000
7	127	13	1000
8	120	18	0

ARMY CORPS OF ENGINEERS MINIMUM FACTORS OF SAFETY		
DESIGN CONDITION	MINIMUM F.S.	REMARKS
END OF CONST.	1.3	US & DS SLOPES
PARTIAL POOL W/ STEADY SEEPAGE	1.5	US SLOPE ONLY
STEADY SEEPAGE W/ MAX STORAGE POOL	1.5	DS SLOPE ONLY
EARTHQUAKE	1.0	US & DS SLOPES

LEGEND

- ○ SOIL LAYERS - STEADY STATE
- □ SOIL LAYERS - CONSTRUCTION CONDITION
- SF SAFETY FACTOR (MINIMUM)
- DS DOWNSTREAM
- US UPSTREAM

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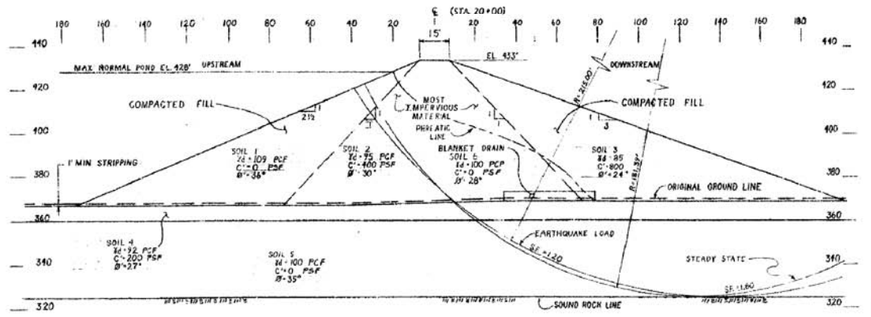
ASH POND D STABILITY ANALYSIS

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

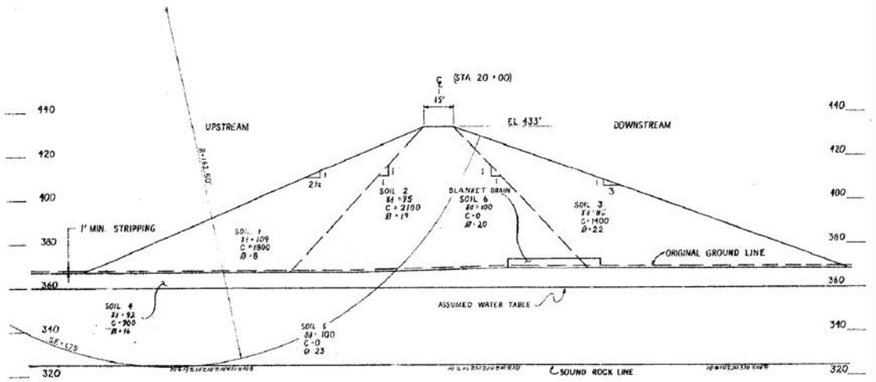
PROJECT NO. 20085.2060

DATE: 12/2009

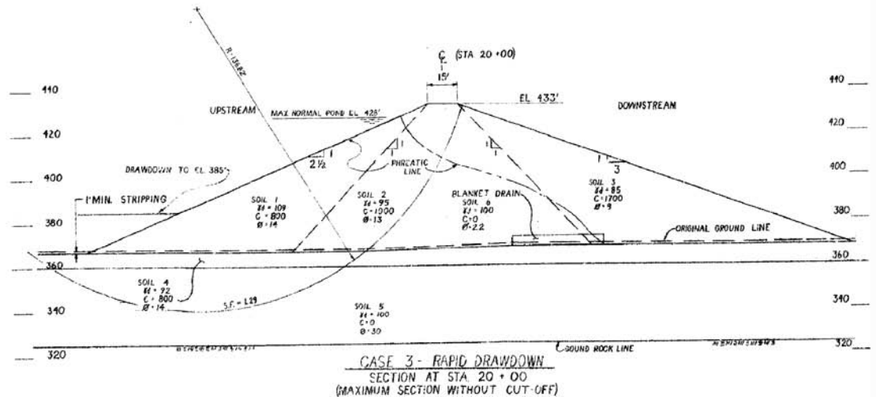
FIGURE 9C



CASE 1 -- STEADY STATE
SECTION AT STA. 20+00
(MAXIMUM SECTION WITHOUT CUT-OFF)



CASE 2 -- CONSTRUCTION
SECTION AT STA. 20+00
(MAXIMUM SECTION WITHOUT CUT-OFF)



CASE 3 - RAPID DRAWDOWN
SECTION AT STA. 20+00
(MAXIMUM SECTION WITHOUT CUT-OFF)

CHA
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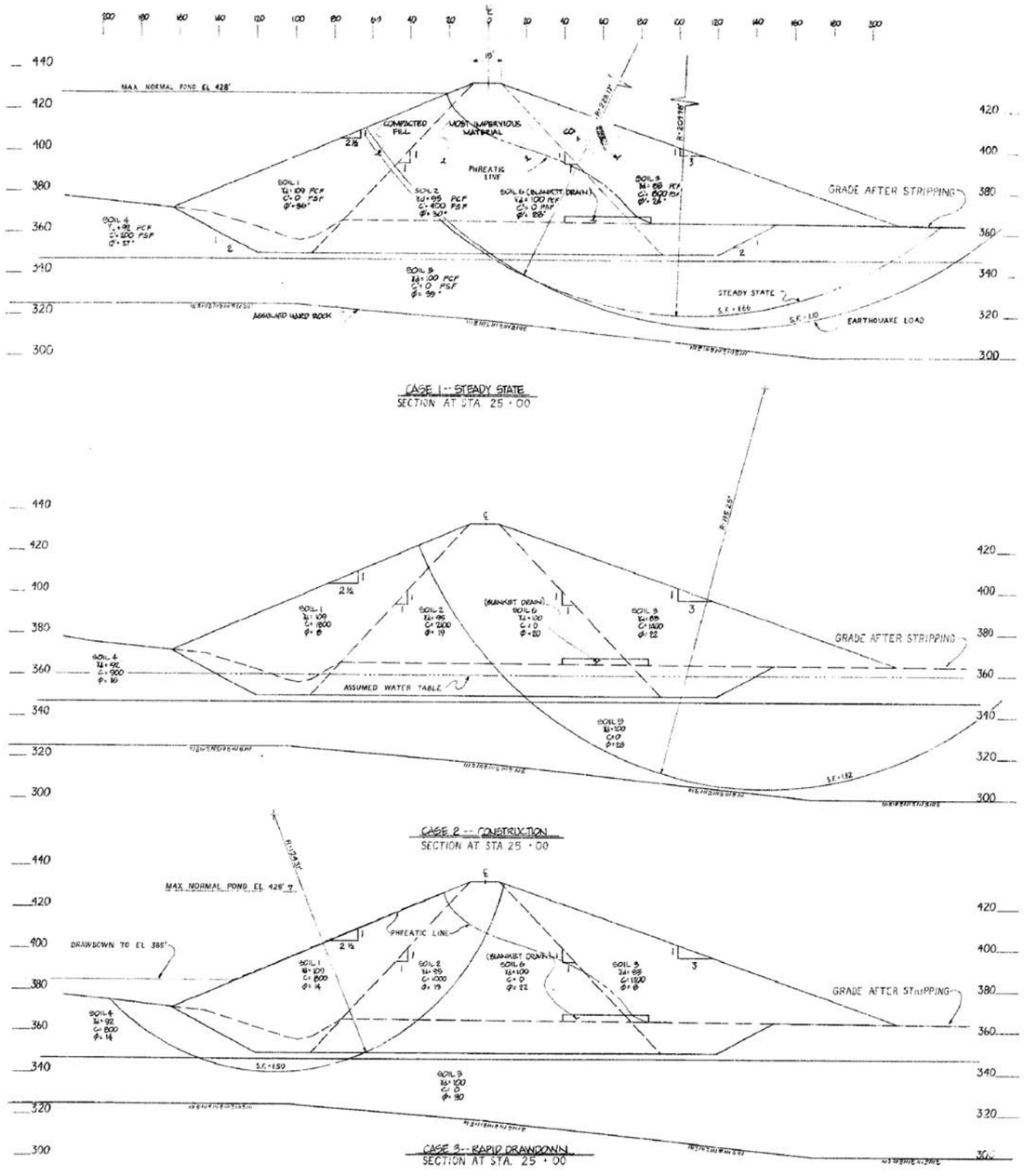
ASH POND C STABILITY ANALYSIS AT STA. 20+00
PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060
DATE: 12/2009
FIGURE 9D



CHA
111 Winners Circle, PO Box 5269 · Albany, NY 12205-0269
Main: (518) 453-4500 · www.chacompanies.com

ASH POND C STABILITY ANALYSIS AT STA. 25+00

PLANT BRANCH
MILLEDGEVILLE, GEORGIA

PROJECT NO. 20085.2060

DATE: 12/2009

FIGURE 9E

4.0 CONCLUSIONS/RECOMMENDATIONS

4.1 Acknowledgement of Management Unit Condition

4.1.1 Acknowledgement of Management Unit Condition – Ash Ponds C, D and E

I acknowledge that the management units referenced herein (Ash Ponds C, D, and E) were personally inspected by me and were found to be in the following condition: **Satisfactory.** This indicates that there is no existing or potential safety deficiencies recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) and that minor maintenance items may be required.

4.1.2 Acknowledgement of Management Unit Condition – Ash Pond B

I acknowledge that the management unit referenced herein (Ash Pond B) was personally inspected by me and was found to be in the following condition: **Fair.** This indicates acceptable performance is expected under required loading conditions in accordance with applicable safety regulatory criteria; however some additional analyses should be performed and documented to verify that these criteria are met.

CHA presents the following recommendations for maintenance and updating of analyses to bring these facilities to satisfactory condition.

4.2 General Condition Monitoring and Maintenance

The following recommendations are based upon observations and review of data provided to CHA. Recommendations provided by the state, utility company, and other consultants should also be implemented.

4.2.1 Ash Pond B

Visually, the downstream slope of the southwest dike at Ash Pond B was found to be in fair condition. Observations could not be made of the upstream slope due to the infilling of the pond with bottom ash. A few areas were observed that warrant monitoring on a routine basis to confirm that changes are not occurring or if periodic maintenance is required. These areas are as follows:

- Brush and trees have grown in the downstream face of the embankment. CHA recommends that the trees should be cut. The resulting stumps should be monitored for decay.

4.2.2 Ash Pond C

Ash Pond C is impounded by three main dikes (west, south, and east dikes). Visually, the downstream and upstream slopes were found to be in satisfactory condition. A few areas were observed that warrant monitoring on a routine basis to confirm that changes are not occurring or if periodic maintenance is required. These areas are as follows:

- Grading along the west dike near the south central portion of the dike should be reviewed to promote positive drainage of storm water.
- Saturated soil conditions were also noted north of the "recycle water" pump station. We understand the Georgia Power has placed rock in this area previously and the wet conditions have continued. CHA recommends that Georgia Power consult with a geotechnical engineer to develop recommendations for this area.
- Wet areas were observed along the downstream toe of the south dike. Southern Company personnel indicated that seepage drains may have been covered during recent grading activities. CHA recommends that the seepage drain outlet be exposed to verify the cause of the wet areas and to improve drainage.

- Non-uniform grading was observed on the upstream slope of the east dike which may be the result of erosion rills. This area should be closely monitored.
- Erosion due to water "lapping" the surface was observed on the upstream side of the south dike. CHA recommends improvements to the erosion protection along the water's edge.

4.2.3 Ash Pond D

Ash Pond D is impounded by a dike along the southwest edge of the pond and a dike on the southeast edge of the pond adjacent to the overflow to Ash Pond C. Visually, the downstream and upstream slopes of the southeast dike were found to be in satisfactory condition. A few areas were observed that warrant monitoring on a routine basis to confirm that changes are not occurring or if periodic maintenance is required. These areas are as follows:

- Based upon observations and discussions during the site visit and subsequent review of the documents provided, we assume that the southeast dike is not included in Southern Company's observation and monitoring program. CHA recommends that this dike be included in future inspections.

4.2.4 Ash Pond E

Ash Pond E is impounded by a dike along the east edge of the pond. Visually, the downstream and upstream slopes of the dike were found to be in satisfactory condition. A few areas were observed that warrant monitoring on a routine basis to confirm that changes are not occurring or if periodic maintenance is required. These areas are as follows:

- Three soft areas have been identified by Southern Company east of the lower concrete lined drainage channel. CHA recommends continued monitoring of these locations for changes.

- Sloughing due to recent rain was noted along the southern end of the downstream slope and sparse vegetation due to mowing activities was also observed. Measures should be implemented to reduce the potential for progressive erosion in these areas.

4.3 Animal Control

Evidence of animal burrows was observed on the upstream and downstream side of several of the dikes. CHA recommends vigilance by Southern Company personnel to make note of areas disturbed by animal activity, trap the animals, and make repairs to areas to protect the integrity of the dikes.

4.4 Site Plan and Instrumentation

CHA recommends that survey plans be prepared for each pond. The plans should include, at a minimum, the location of the constructed dikes, limits of existing ponds, water level in the ponds, location of instrumentation, and location and elevation of normal operation and emergency spillways. These plans should include stationing from the design documents to assist in a comparison of the design and as-built conditions.

We understand that the piezometers are read weekly by plant personnel and Southern Company reviews the instrumentation data on a quarterly basis. The instrumentation location survey for Ash Pond E provides the location of seven deformation and settlement monuments (SM1 through SM7). CHA recommends that survey measurement be collected at these locations on a regular basis and that Southern Company review the data.

4.5 Hydrologic and Hydraulic Recommendations

CHA recommends that a hydrologic and hydraulic analysis be performed for each of the active ponds. Ash Ponds B, C, and D are not regulated by Georgia EPD, therefore there are no specific

hydrologic and hydraulic design guidelines. CHA suggests the impoundment be evaluated for susceptibility to overtopping during a reasonable design storm.

CHA recommends that a hydrologic and hydrology analysis be performed for Ash Pond E. The design storm should be consistent with the Georgia regulations based upon the size of the impoundment.

4.6 Stability Recommendations

CHA was provided with slope stability analysis from the construction documents for Ash Ponds C, D, and E. Information regarding the as-constructed embankment cross-section and corresponding shear strength values is not available. Therefore, CHA recommends that a geotechnical exploration program be undertaken to assess the existing soil conditions within and below the dikes.

Slope stability analysis was not available for Ash Pond B. CHA recommends that a geotechnical exploration program undertaken and a corresponding slope stability analysis performed. This assessment should include determination of the extent of the grout placement within the dike at Ash Pond B. Although the grouted portions will likely function as a stable mass, the stability of adjacent sections should be evaluated. The potential for development of piping through the embankment should also be considered.

4.7 Inspection Recommendations

CHA recommends that Georgia Power and Southern Company continue the piezometer monitoring and inspections that have been implemented for the Ash Ponds. This type of inspection allows for proactive responses to developing situations, which can reduce the risk of damaging releases or failures from occurring.

5.0 CLOSING

The information presented in this report is based on visual field observations, review of reports and this limited knowledge of the history of the Plant Branch Ash Ponds. The recommendations presented are based, in part, on project information available at the time of this report. No other warranty, expressed or implied is made. Should additional information or changes in field conditions occur, the conclusions and recommendations provided in this report should be re-evaluated by an experienced engineer.

APPENDIX A

Completed EPA Coal Combustion Dam Inspection Checklist Forms

&

Completed EPA Coal Combustion Waste (CCW) Impoundment Inspection Forms

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: Plant Branch Generation Station	Date: November 24, 2009
Unit Name: Ash Pond B	Operator's Name: Georgia Power
Unit I.D.:	Hazard Potential Classification: High **Significant** Low
Inspector's Name: Malcolm D. Hargraves P.E./Cody Johnson	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	376 see note		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	372		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	n/a		Is water entering inlet, but not exiting outlet?	see	note
5. Lowest dam crest elevation (operator records)?	380		Is water exiting outlet, but not entering inlet?	see	note
6. If instrumentation is present, are readings recorded (operator records)?	n/a		Is water exiting outlet flowing clear?	see	note
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?	n/a	
9. Trees growing on embankment? (If so, indicate largest diameter below)	x		At isolated points on embankment slopes?	see	note
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?	see	note
11. Is there significant settlement along the crest?		x	Over widespread areas?	see	note
12. Are decant trashracks clear and in place?	x		From downstream foundation area?	see	note
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?	see	note
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?	see	note	23. Water against downstream toe?	x	
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments n/a = not applicable/available

1 Plant personnel visually inspect daily and weekly; monthly and quarterly reports are generated for water quality, piezometric levels, volumetric flows, and engineering inspections where applicable.

2, 3 Ground surface estimated from historic documents and photos. Pond is dry and forested near dam and decant.

9 Downstream slope is heavily vegetated with brush and 8 to 12 inch diameter trees growing among large rock.

16, 20 Decant outlet not active. Water recycled through plant to sluice ash or released to lake via valve in plant.

21 Seeps cannot be readily observed due to rain at time of site assessment. Current outlet pipe is buried and exits into plant - not observed. Old outlet is inactive.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # GA0026051 INSPECTOR Hargraves\Johnson

Date November 24, 2009

Impoundment Name Ash Pond B

Impoundment Company Georgia Power

EPA Region 4

State Agency (Field Office) Addresss Northeast District Regional EPD Office
745 Gaines School Rd.; Athens, GA 30605

Name of Impoundment Ash Pond B

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update x

	Yes	No
Is impoundment currently under construction?	_____	x
Is water or ccw currently being pumped into the impoundment?	x	_____

IMPOUNDMENT FUNCTION: Bottom ash disposal

Nearest Downstream Town : Name Milledgeville, GA

Distance from the impoundment 9.0 miles (via lake/river)

Impoundment Location:
Longitude 83 Degrees 18 Minutes 11.8 Seconds
Latitude 33 Degrees 11 Minutes 29.5 Seconds
State Georgia County Putnam

Does a state agency regulate this impoundment? YES x NO _____

If So Which State Agency? Georgia Dept. of Nat. Resources - Envir. Protection Division

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

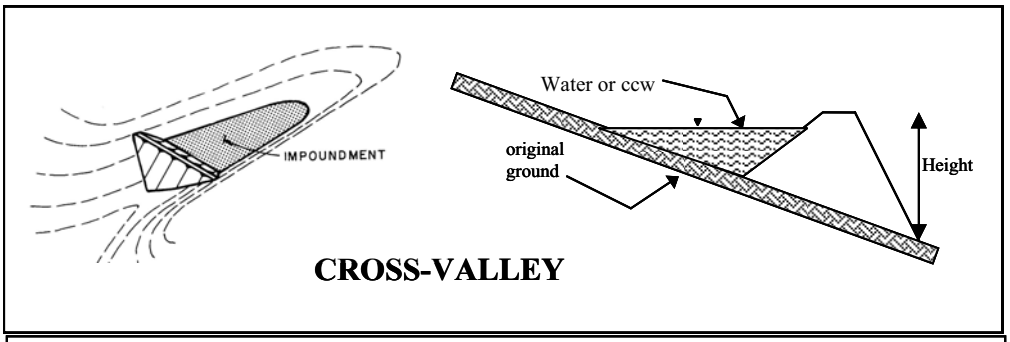
x_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

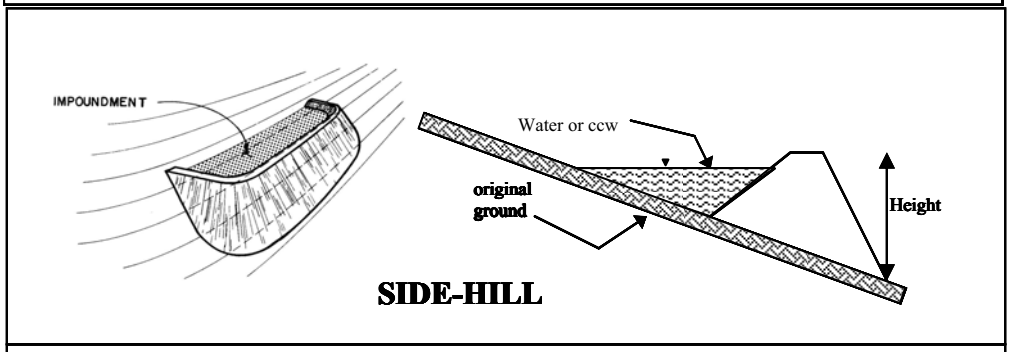
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

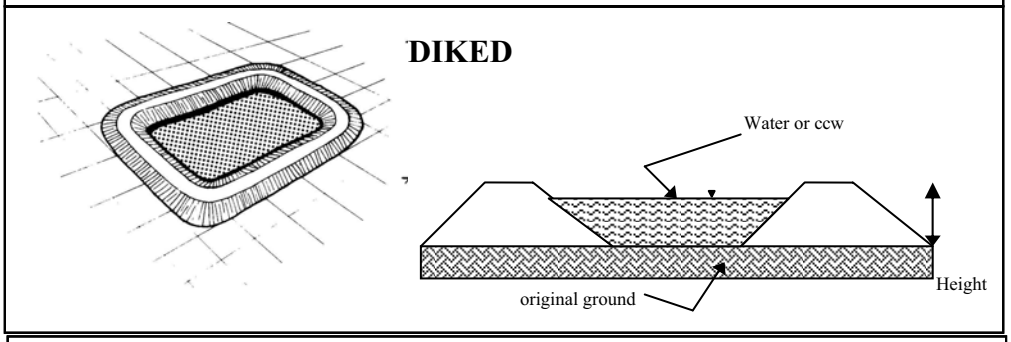
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

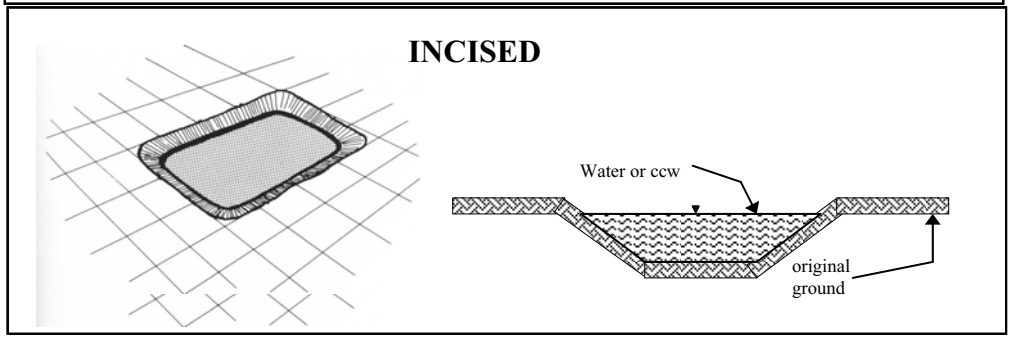
Failure of dike and subsequent erosion would impact Lake Sinclair.

CONFIGURATION:









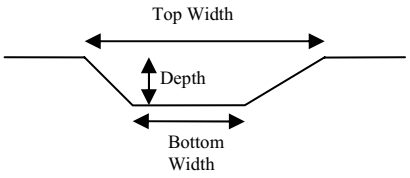
x_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height 80 (max.) feet
Embankment Material Earth/rock fill
Pool Area 75 acres
Liner none
Current Freeboard n/a feet
Liner Permeability n/a

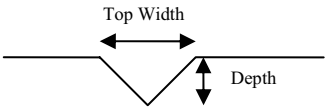
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

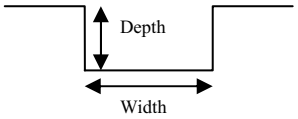


TRIANGULAR

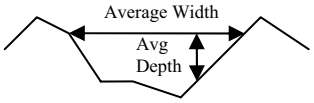


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

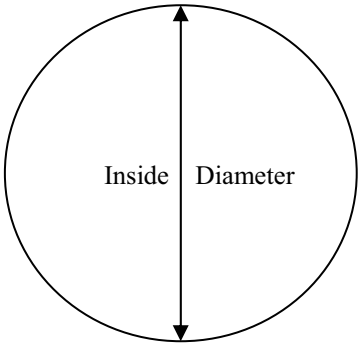


IRREGULAR



x _____ **Outlet**

36" _____ inside diameter



Material
x _____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO x _____

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Georgia Power
_____

Has there ever been a failure at this site? YES _____ NO x_____

If So When? _____

If So Please Describe :

Has there ever been significant seepages at this site? YES x NO _____

If So When? November to December 1968

IF So Please Describe:

Upon initial filling and commencing ash sluicing activities, five leakage/seepage zones were observed near lake (Lake Sinclair) level on the downstream slope of the dam. The largest of these seepages was referred to as a cascade at Station 3+20 in the available documentation. The documentation also notes that these seeps transported ash into Lake Sinclair where it was subsequently deposited on nearby beaches. After attempts to arrest the seepage with a dumped soil blanket on the upstream slope failed, a grouting program was planned and implemented in January of 1969. In this program, a grout curtain with primary, secondary, and tertiary (where required) holes was installed on the crest along the upstream slope of the dam. An abandoned discharge pipe was also grouted closed during the grout curtain installation because it intersected the curtain line. The grouting program successfully arrested the leakage and was completed by the end of March 1969.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____NO x_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe :

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: Plant Branch Generation Station	Date: November 24, 2009
Unit Name: Ash Pond C	Operator's Name: Georgia Power
Unit I.D.:	Hazard Potential Classification: High **Significant** Low
Inspector's Name: Malcolm D. Hargraves P.E./Cody Johnson	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note		18. Sloughing or bulging on slopes?	x	
2. Pool elevation (operator records)?	395		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	397		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	n/a		Is water entering inlet, but not exiting outlet?	see	note
5. Lowest dam crest elevation (operator records)?	400		Is water exiting outlet, but not entering inlet?	see	note
6. If instrumentation is present, are readings recorded (operator records)?	x		Is water exiting outlet flowing clear?	see	note
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?	x	
9. Trees growing on embankment? (If so, indicate largest diameter below)		x	At isolated points on embankment slopes?	see	note
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?	see	note
11. Is there significant settlement along the crest?		x	Over widespread areas?	see	note
12. Are decant trashracks clear and in place?	x		From downstream foundation area?	see	note
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?	see	note
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?	x		23. Water against downstream toe?	x	
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments n/a = not applicable/available

1 Plant personnel visually inspect daily and weekly; monthly and quarterly reports are generated for water quality, piezometric levels, volumetric flows, and engineering inspections where applicable.

3, 5 Elevations are estimated from historic documents and photos.

16, 20 Decant outlet inactive; water siphoned to Pond B. Buttress covers newer toe drains impacted by mowing.

18 Mowing has caused deformation in grass slopes.

21 Seeps cannot be readily observed due to rain. Old outlet is inactive - water siphons to Pond B.

23 Portion of impoundment abuts Lake Sinclair.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # GA0026051 INSPECTOR Hargraves\Johnson

Date November 24, 2009

Impoundment Name Ash Pond C

Impoundment Company Georgia Power

EPA Region 4

State Agency (Field Office) Addresss Northeast District Regional EPD Office
745 Gaines School Rd.; Athens, GA 30605

Name of Impoundment Ash Pond C

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update x

	Yes	No
Is impoundment currently under construction?	_____	x
Is water or ccw currently being pumped into the impoundment?	x	_____

IMPOUNDMENT FUNCTION: Fly ash, pyrite, Bottom ash disposal - currently polishing pond

Nearest Downstream Town : Name Milledgeville, GA

Distance from the impoundment 9.4 miles

Impoundment Location:
Longitude 83 Degrees 18 Minutes 19.9 Seconds
Latitude 33 Degrees 11 Minutes 12.7 Seconds
State Georgia County Putnam

Does a state agency regulate this impoundment? YES _____ NO x

If So Which State Agency? Georgia Dept. of Nat. Resources - Envir. Protection Division

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

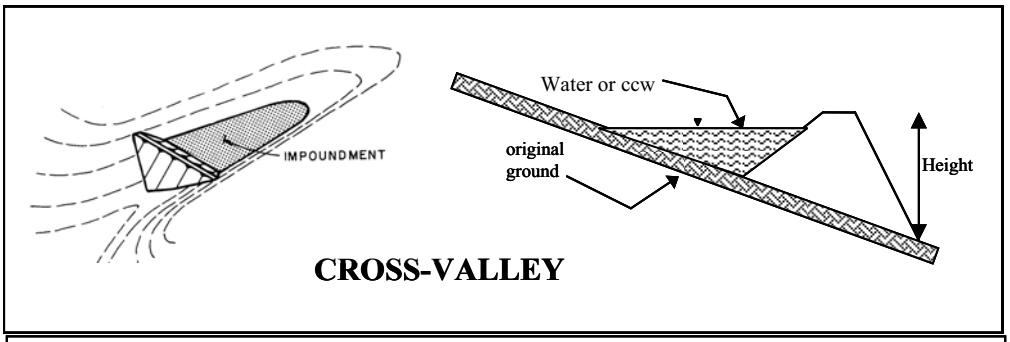
x_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

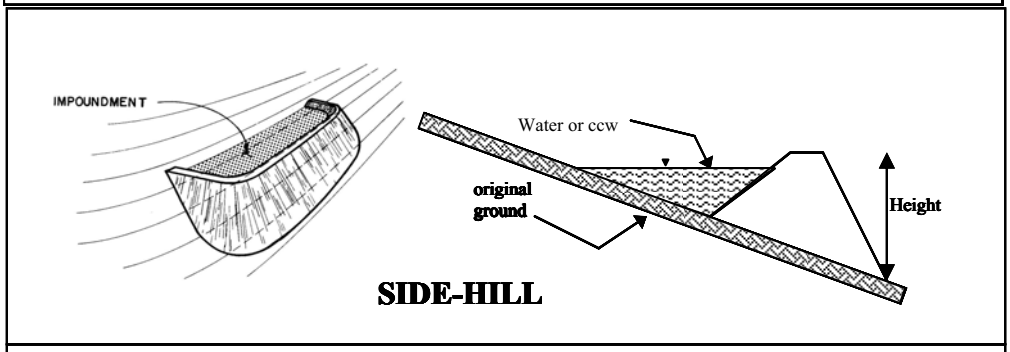
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

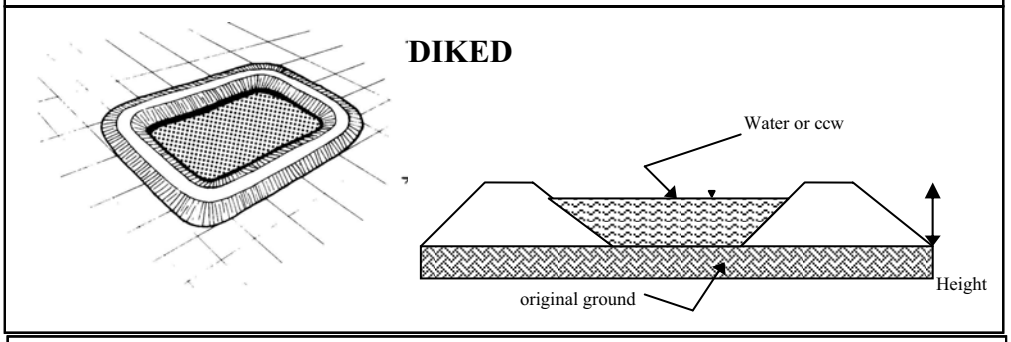
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

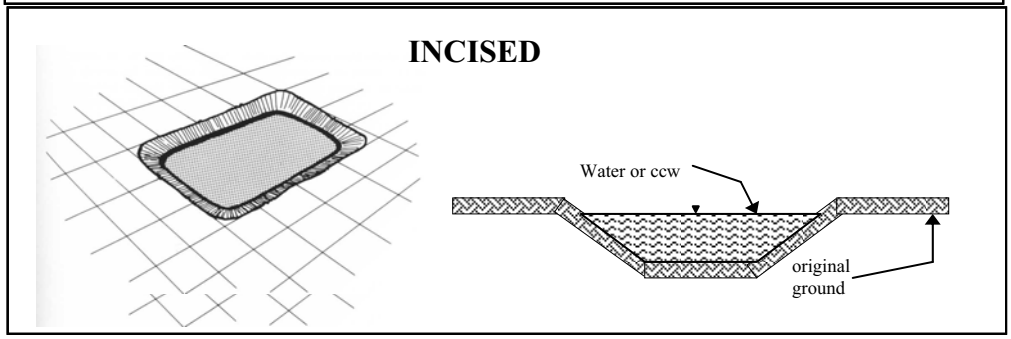
Failure of dike would impact Lake Sinclair.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
x____ Combination Incised/Diked

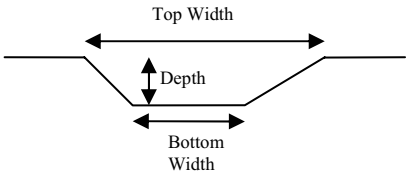
Embankment Height 83 feet
Pool Area 70 acres
Current Freeboard 5 feet

Embankment Material Earth fill
Liner none
Liner Permeability n/a

TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL



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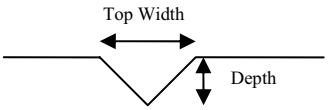
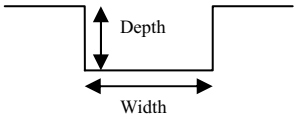
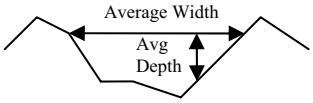


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

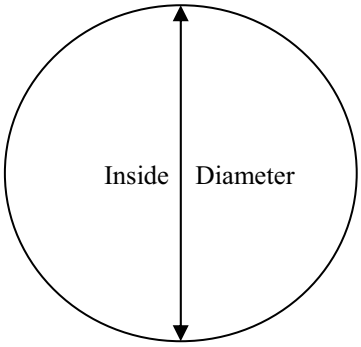


IRREGULAR



x _____ **Outlet**

30" _____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
x _____ other (specify) fiberglass (not active)

_____

Is water flowing through the outlet? YES x (below) NO _____

_____ **No Outlet**

_____

x _____ **Other Type of Outlet** (specify) Two 36" dia. hdpe siphons to B Pond

The Impoundment was Designed By Georgia Power

_____

Has there ever been a failure at this site? YES x NO _____

If So When? December 8, 2000

If So Please Describe :

The failure was mechanical in nature. An isolation valve on a siphon line malfunctioned, causing water to be siphoned from Pond C back through the cooling tower intake complex and discharge tunnel into Lake Sinclair. The failure did not involve dike or geologic instability.

Has there ever been significant seepages at this site? YES _____ NO x_____

If So When? _____

IF So Please Describe:

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____NO x_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe :

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: Plant Branch Generation Station	Date: November 24, 2009
Unit Name: Ash Pond D	Operator's Name: Georgia Power
Unit I.D.:	Hazard Potential Classification: High **Significant** Low
Inspector's Name: Malcolm D. Hargraves P.E./Cody Johnson	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note		18. Sloughing or bulging on slopes?	x	
2. Pool elevation (operator records)?	400		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	n/a		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	400/401		Is water entering inlet, but not exiting outlet?		n/a
5. Lowest dam crest elevation (operator records)?	403		Is water exiting outlet, but not entering inlet?		n/a
6. If instrumentation is present, are readings recorded (operator records)?	x		Is water exiting outlet flowing clear?		n/a
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?	x	
9. Trees growing on embankment? (If so, indicate largest diameter below)		x	At isolated points on embankment slopes?	see	note
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?	see	note
11. Is there significant settlement along the crest?		x	Over widespread areas?	see	note
12. Are decant trashracks clear and in place?	n/a		From downstream foundation area?	see	note
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		n/a
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?		x	23. Water against downstream toe?		x
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments n/a = not applicable/available

1 Plant personnel visually inspect daily and weekly; monthly and quarterly reports are generated for water quality, piezometric levels, volumetric flows, and engineering inspections where applicable.

2, 4 Pond D outlets via culvert and open channel to Pond C. Pond D has an emergency spillway at El. 401

18 Mowing has caused deformation in grass slopes.

21 Two seeps in downstream foundation or hillside area were previously delineated by Georgia Power; otherwise new seeps cannot be readily observed and are likely obscured due to recent rain at time of site assessment.

Underdrain seepage was clear.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # GA0026051 INSPECTOR Hargraves\Johnson

Date November 24, 2009

Impoundment Name Ash Pond D

Impoundment Company Georgia Power

EPA Region 4

State Agency (Field Office) Addresss Northeast District Regional EPD Office
745 Gaines School Rd.; Athens, GA 30605

Name of Impoundment Ash Pond D

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update x

	Yes	No
Is impoundment currently under construction?	_____	x
Is water or ccw currently being pumped into the impoundment?	x	_____

IMPOUNDMENT FUNCTION: Fly ash, pyrite, bottom ash disposal - currently polishing pond

Nearest Downstream Town : Name Milledgeville, GA

Distance from the impoundment 10.7 miles (via lake/river)

Impoundment Location:
Longitude 83 Degrees 18 Minutes 19.9 Seconds
Latitude 33 Degrees 11 Minutes 12.7 Seconds
State Georgia County Putnam

Does a state agency regulate this impoundment? YES x NO _____

If So Which State Agency? Georgia Dept. of Nat. Resources - Envir. Protection Division

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

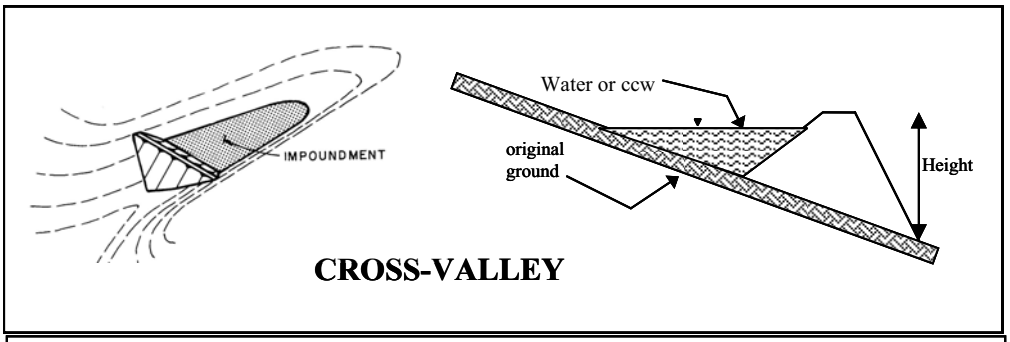
x_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

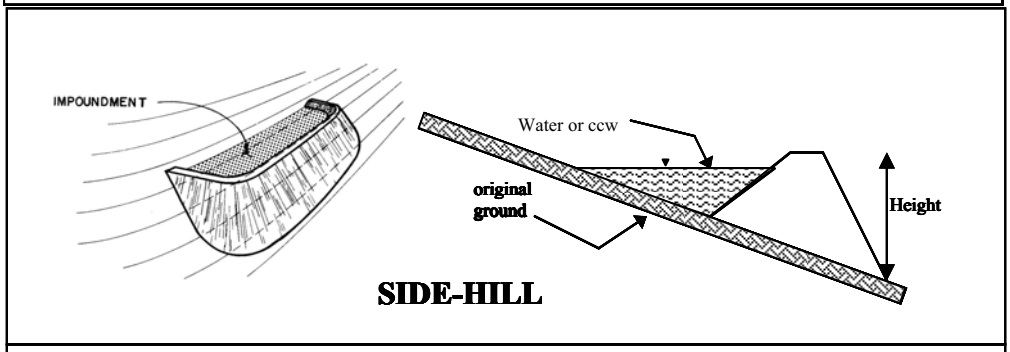
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

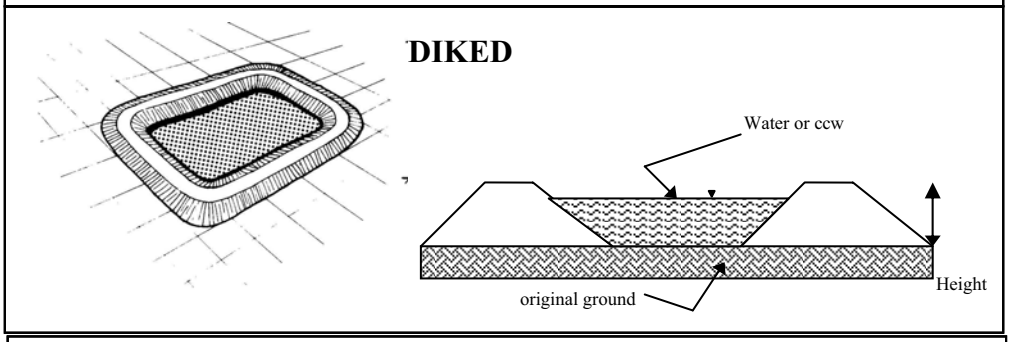
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

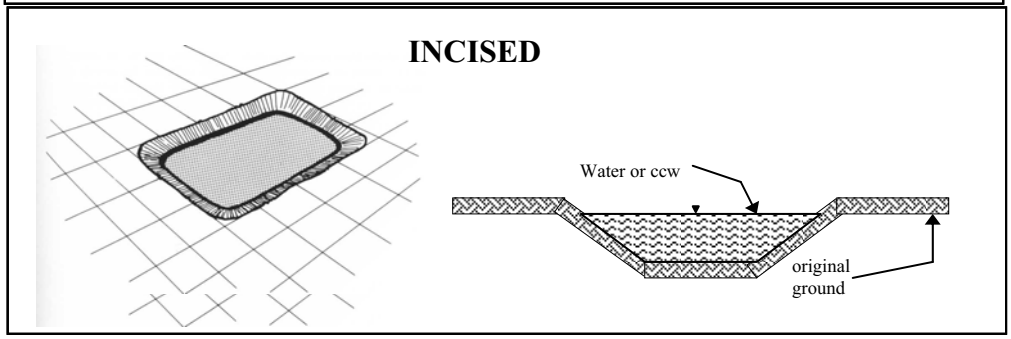
Failure of dike would impact Lake Sinclair.

CONFIGURATION:









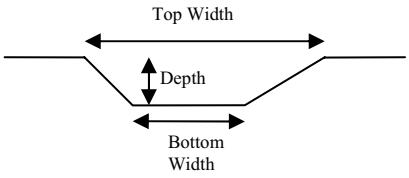
x____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height 63 feet
Embankment Material Earth fill
Pool Area 45 acres
Liner none
Current Freeboard 3 feet
Liner Permeability n/a

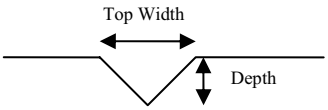
TYPE OF OUTLET (Mark all that apply)

x **Open Channel Spillway**
x Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

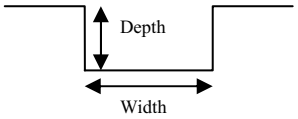


TRIANGULAR

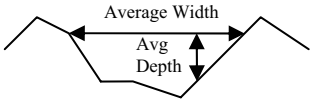


2 depth
20 bottom (or average) width
28 top width

RECTANGULAR

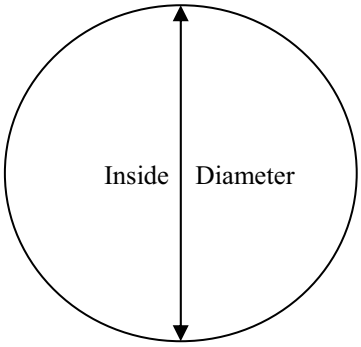


IRREGULAR



x **Outlet**

48" inside diameter



Material
x corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
x other (specify) culvert to open channel

Is water flowing through the outlet? YES x NO _____

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Georgia Power

Has there ever been a failure at this site? YES _____ NO x_____

If So When? _____

If So Please Describe :

Has there ever been significant seepages at this site? YES _____ NO x_____

If So When? _____

IF So Please Describe:

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____NO x_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe :

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: Plant Branch Generation Station	Date: November 24, 2009
Unit Name: Ash Pond E	Operator's Name: Georgia Power
Unit I.D.:	Hazard Potential Classification: **High** Significant Low
Inspector's Name: Malcolm D. Hargraves P.E./Cody Johnson	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	see note		18. Sloughing or bulging on slopes?		x
2. Pool elevation (operator records)?	429		19. Major erosion or slope deterioration?		x
3. Decant inlet elevation (operator records)?	429		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	430		Is water entering inlet, but not exiting outlet?		n/a
5. Lowest dam crest elevation (operator records)?	433/434		Is water exiting outlet, but not entering inlet?		n/a
6. If instrumentation is present, are readings recorded (operator records)?	x		Is water exiting outlet flowing clear?		n/a
7. Is the embankment currently under construction?		x	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	n/a		From underdrain?	x	
9. Trees growing on embankment? (If so, indicate largest diameter below)		x	At isolated points on embankment slopes?	see	note
10. Cracks or scarps on crest?		x	At natural hillside in the embankment area?	x	
11. Is there significant settlement along the crest?		x	Over widespread areas?	see	note
12. Are decant trashracks clear and in place?		x	From downstream foundation area?	x	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		x	"Boils" beneath stream or ponded water?		x
14. Clogged spillways, groin or diversion ditches?		x	Around the outside of the decant pipe?		n/a
15. Are spillway or ditch linings deteriorated?		x	22. Surface movements in valley bottom or on hillside?		x
16. Are outlets of decant or underdrains blocked?	see	note	23. Water against downstream toe?		x
17. Cracks or scarps on slopes?		x	24. Were Photos taken during the dam inspection?	x	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments n/a = not applicable/available

1 Plant personnel visually inspect daily and weekly; monthly and quarterly reports are generated for water quality, piezometric levels, volumetric flows, and engineering inspections where applicable.

4, 5 Pond has an emergency spillway at El. 430 and a concrete wave screen on the crest extending to El. 434.

12 Cenospheres have flooded the decant riser under the trash rack and have not been harvested.

16, 20 Outlet is submerged and not observed; conveys water to Pond D.

21 Three seep areas in the downstream and hillside foundation areas have been monitored over time by Georgia Power. Recent rains prior to site visit would have obscured new seep areas. Underdrain seepage was clear.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # GA0026051 INSPECTOR Hargraves\Johnson

Date November 24, 2009

Impoundment Name Ash Pond E

Impoundment Company Georgia Power

EPA Region 4

State Agency (Field Office) Addresss Northeast District Regional EPD Office
745 Gaines School Rd.; Athens, GA 30605

Name of Impoundment Ash Pond E

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update x

	Yes	No
Is impoundment currently under construction?	_____	x
Is water or ccw currently being pumped into the impoundment?	x	_____

IMPOUNDMENT FUNCTION: Fly ash disposal

Nearest Downstream Town : Name Milledgeville, GA

Distance from the impoundment 11.6 miles (via lake/river)

Impoundment Location:
Longitude 83 Degrees 19 Minutes 35.0 Seconds
Latitude 33 Degrees 12 Minutes 15.0 Seconds
State Georgia County Putnam

Does a state agency regulate this impoundment? YES x NO _____

If So Which State Agency? Georgia Dept. of Nat. Resources - Envir. Protection Division

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

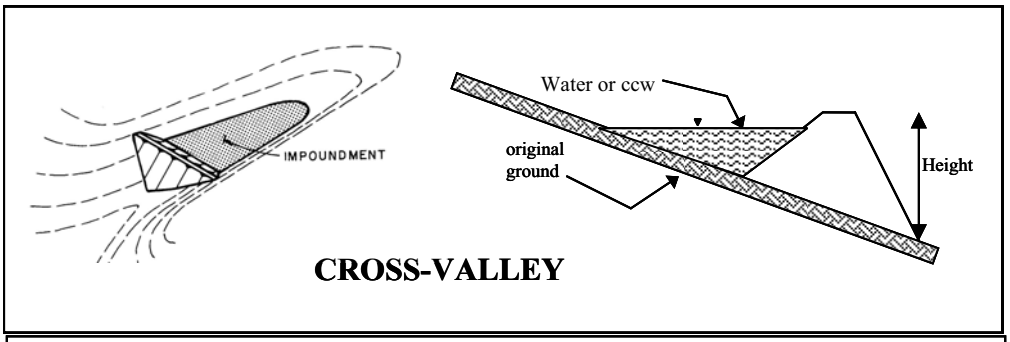
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

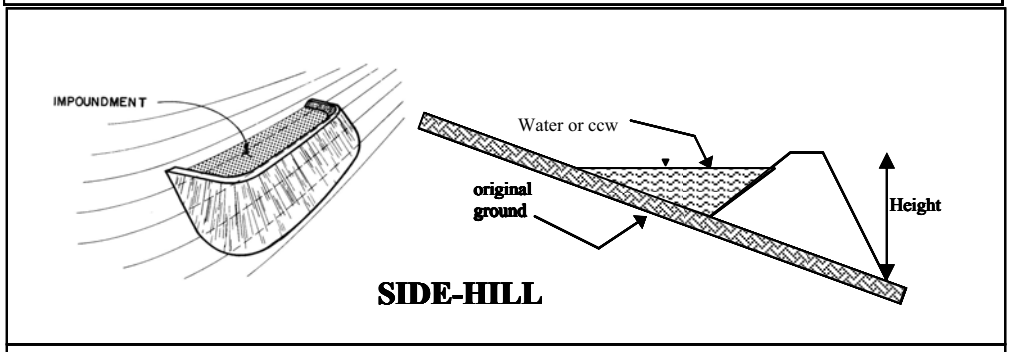
x_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

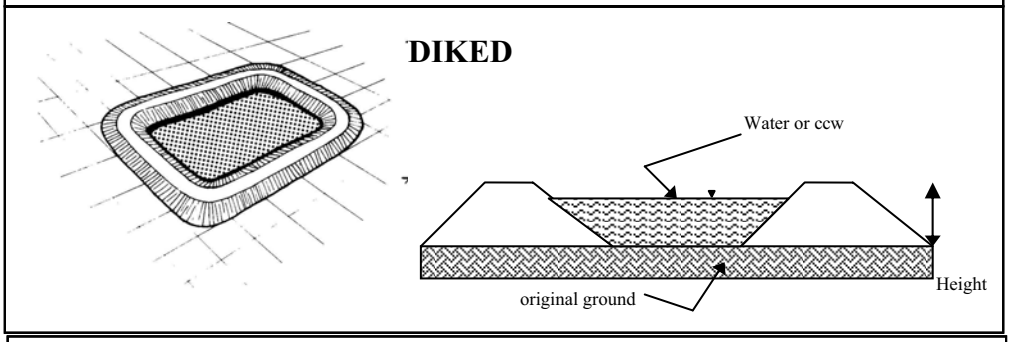
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

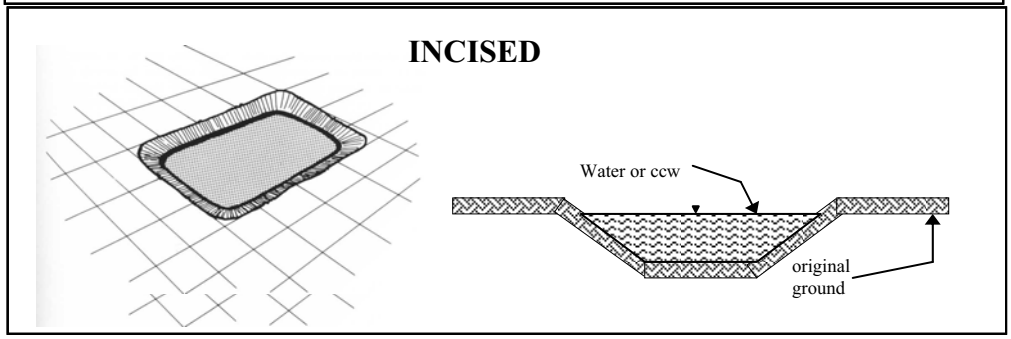
Failure of dike would impact Lake Sinclair, some lake front residences, and the power plant.

CONFIGURATION:









x____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

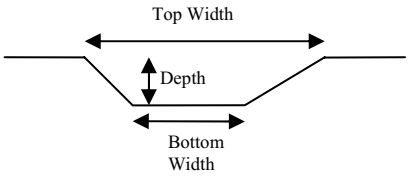
Embankment Height 73 feet
Pool Area 311 acres
Current Freeboard 4 feet

Embankment Material Earth fill
Liner none
Liner Permeability n/a

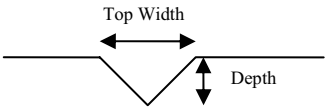
TYPE OF OUTLET (Mark all that apply)

x **Open Channel Spillway**
x Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

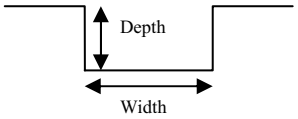


TRIANGULAR

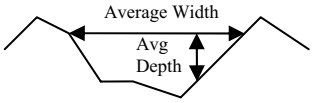


1 depth
150 bottom (or average) width
_____ top width

RECTANGULAR

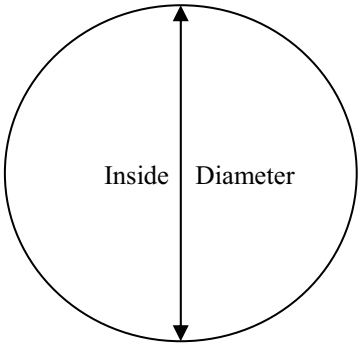


IRREGULAR



x **Outlet**

36" inside diameter



Material
_____ corrugated metal
x welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES x NO _____

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Georgia Power

Has there ever been a failure at this site? YES _____ NO x_____

If So When? _____

If So Please Describe :

Has there ever been significant seepages at this site? YES _____ NO x_____

If So When? _____

IF So Please Describe:

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____NO x_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe :